

Dynamic Approach to Competitive Intelligence: Case Studies of Large-Scale Swiss Telecom Firms

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Abstract

The research aim is to understand how the competitive intelligence (CI) process in large-scale Swiss telecom companies contributes to management decision-making. Studying CI activities of the Swiss large-scale telecom firms (Swisscom, Sunrise, Orange/Salt, Cablecom) in a dynamic European context offers useful insight into the critical challenges that service firms now face when developing intelligence in disruptive market contexts where aggressive competitive behaviour is evident.

In considering CI theory, this study has reviewed perspectives drawn from research on the CI process, studies on knowledge management and work on systems thinking. In extending the predominant modular view of CI to include elements of systems thinking, this study has added to our academic understanding of CI at firm level. An Integrative CI Activities framework was developed that enables a more holistic perspective of CI to be adopted, taking account of operational, organisational and strategic perspectives. A diagram representing the range of CI analysis methodologies has also been generated, that differentiates between internal/external orientation and static/dynamic forms of CI analysis. Such frameworks can be used by CI researchers in other market contexts.

The methodology for this study drew on a pragmatist philosophy, using a case study strategy that adopted mixed methods in data collection, including semi-structured depth interviews with top CI Analysts in each firm. Findings have shown differences in the scope of CI Activities that link to stages of CI development (developing, developed) and variation between headquarters-centred and firm-centred approaches to CI planning and implementation. The adoption of query based, flexible analysis approaches in firm-centred settings differ from more structured CI analysis techniques in headquarters-based firms. Evidence from this study suggests that networked communication, strong feedback mechanisms and the adoption of more flexible CI analyst roles link to more effective CI processes and to greater potential for direct CI contribution to decision-making.

Key contributions emerge through the three lenses of analysis adopted (operational, organisational and strategic); in terms of operational CI processes, the study identifies a complex integrated system at work in firms that implement CI effectively. In studying the link between organisational structure and CI analysis, the study has mapped organisational support patterns and how they shape the CI process at firm level. With respect to the strategic lens, following a detailed worked study of predictive analysis in one case firm, findings have identified adaptiveness in CI design as essential to address disruptive market change. Managerial consideration include a need for a) greater flexibility in CI implementation at firm level to adapt to turbulent markets, b) acknowledgement of the importance of the CI analyst role further and c) more dynamic CI content to be generated by CI analysts.

Keywords: competitive intelligence, CI analysis, disruptive market change, Swiss telecom

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In loving memory of Gabi and Nico

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Chapter 1: Introduction

1.1 Introduction

This PhD study investigates the Competitive Intelligence process and how it links to management decision-making in the Swiss telecom market. This chapter is structured as follows. **Section 1.2** discusses the research background and conceptual focus, **Section 1.3** provides an overview of Swiss telecom market. **Section 1.4** presents the research aim and objectives, and **Section 1.5** identifies potential contributions of this research, and **Section 1.6** shows the structure of this research.

1.2 Conceptual Focus – Competitive Intelligence

Past studies (Prescott 2003; Fuld 1995) have emphasised operational issues in Competitive Intelligence management. By identifying CI modules – planning and focus, collection, analysis, communication, and decision – they offered a way for practitioners to conduct analyses about their competitive environment that potentially influence firm performance (Krizan 1999; Jaworski and Wee 1992). By showing how to operate analyses about the firm’s environment, they contributed to better understand CI and its importance (Weiss 2002).

In contrast, this PhD study develops a broader concept of the CI activities, with a focus on both core activities and on systems that support CI activities. The study focuses on the firm perspectives while also seeking insight into the organisational context that supports CI. First, the research concentrates on the nature of the CI process, identifies factors that potentially influence CI analyst approaches to gathering and analysing qualitative and quantitative data about CI. With an emphasis on data analysis as the core part of the CI process (Prescott 2003; Dishman and Calof 2008), it is hoped to define practical CI analysis approach across firms. Second, it is the first study to focus on the structure underpinning CI activities, with a possible outcome of explaining variations in CI processes through organisational characteristics.

In contrast to the other applied approaches, Miller (2002) considered CI as the basis for strategy and this study takes his work further by focusing on examining the strategic implications of CI in their activities with evolving market developments and strong competitive service offers to customers from rivals (Ketchen, Snow and Street 2004). Third, elements of effectiveness and sophistication of CI analyses are assessed that contribute to management decision-making. This third aspect builds on the knowledge from the previous aspects because these allow to evaluate the CI processes based on their organisational background. The expected outcome is to explain how variations in CI approaches can effectively contribute with differing emphasise – and potential for development – to decision making.

1.3 Research Background: Focus on Swiss Telecom Context

Between 2006 and 2010 the Swiss telecom sector became a saturated market (BAKOM 2005) characterised by reorganisation (Swisscom), and takeovers (Sunrise, Cablecom) during that period. Planned growth and price cuts showed the intensification of competition (Brändle *et al.* 2012). The liberalisation of the ‘last mile’ in 2007 allowed telecoms to offer unbundled services (BAKOM 2007) that led to a) further price cuts and intensification of competition between the four main telecom providers (Swisscom, Sunrise, Orange and Cablecom); and b) new providers for mobile services using the mobile net of the main providers (Swisscom, Sunrise and Orange), so called MVNO (Mobile Virtual Network Operators). Ghezzi (2011), who investigated the Italian mobile telecommunication market, characterised the telecom industry as being volatile, dynamic, and technology intensive – viewed from the market and at firm level – with strategic implications. In a similar way, the fast paced technological development of the Swiss sector (Report Federal Council 2010) generates intense competitive rivalry.

The Swiss telecom sector is characterised by high technological pace and competitive pressure (BAKOM 2005). The dynamic change that characterises the telecom sector constitutes market pressure on firms to intensively analyse their market and align their strategy (D’Aveni 2002). Competition drives technological developments (Porter 1998), which is especially the case in saturated markets such as the Swiss telecom market

(Brändle, Schlegel, Caprarese, Christen, Gachet, Kaufmann, Kraft, Künzi, Merki, Roggo and Tanner 2012). Saturated markets are regarded as the ‘most competitive’ ones (Vernon and Wells 1966). For the Swiss telecom sector, new product and service offers are key to create customer desires (Inside-IT 2013).

Studying Competitive Intelligence activities offers both a market and an internal perspective (Jaworski and Wee 1992) for a useful investigation into an emergent competitive environment. To date, the CI process of the Swiss telecom sector has not been analysed for these specifics. The study analyses the Swiss large-scale telecom firms – Swisscom, Sunrise, Orange (since 2015 Salt.), and Cablecom. Gaining intelligence that enables firms to adapt to organisational and technological changes is seen as the key focus of CI processes for the four telecom firms. An analysis detailing their approaches offers insight into how they systematically observe and analyse market developments, and seeks to identify how this feeds into their decision-making. By identifying key elements of the CI Process and analysing the relatedness of these elements in firms, patterns should emerge, which offer a useful example of the nature and the scope of CI activities at firm level.

This work builds on the work of several past authors (Tutunea and Rus 2012; McIntosh, Ascough II, Twery, Chew, Elmahdi, Haase, Harou, Hepting, Cuddy, Jakeman, Chen, Kassahun, Lautenbach, Matthews, Merrit, Quinn, Rodriguez-Roda, Sieber, Stavenga, Sulis, Ticehurst, Volk, Wrobel, van Delden, El-Sawah, Rizzoli and Voinov 2011). Michaeli (2005) identified that an effective CI process supports analysis, assessment and priority setting. To evaluate these elements, this study aims to identify analyst perceptions of their CI processes through self- evaluation and researcher evaluation of evidence for effectiveness and sophistication. The structured analysis of CI process and systems and how they link to management decision-making in Swiss telecom firms offers new insights into CI activities in practice.

1.4 Research Aims and Objectives: the CI Process in Context with Management Decision Making

The research aim is to understand how the organisation and implementation of CI processes in the large-scale Swiss telecom companies contributes to management decision-making. Three complementary lenses of analysis are followed: the first lens (operational) examined the nature of the CI process with a view to developing a conceptual framework on the one hand, and on the other, gaining evidence on the elements of that preliminary framework from the perceptions of CI analysts themselves. The second lens (organisational) involved examining elements of structure that underpinned CI activities in firms – this included an examination of the CI analyst team organisation and the systems to support the implementation of CI at firm level. Finally, the third lens (strategic) of analysis investigated the link between CI analysis and management decision-making.

The first lens of analysis – operational lens – examines the nature of CI activities in firms, leading to the following objective:

1. To identify the nature and scope of CI activities (operational elements) in the four case firms

The second lens – organisational lens – examines elements of structure that underpinned CI activities in firms. This was addressed through the following objective:

2. To examine how organisational structures shape the CI processes in the four case firms

The variation at organisational level in the four firms is examined by considering the structuring of CI activities in firms and the information systems in use. The identification of explicit and implicit approaches to CI analyses enables the researcher to identify organisational patterns that shape both the work of CI analysts and the forms of analyses undertaken.

The third lens of analysis – strategic lens – investigates the link between CI analysis and management decision-making. This is achieved through two sub-objectives.

3A. To evaluate analysis approaches in the four case firms

This study looks at how analysis approaches vary with firm organisation; whether analysis addresses static or dynamic perspectives and the extent to which basic, comparative and priority setting analyses are used in practice by the four case firms. The perceptions of the analysts of CI process and system effectiveness are gathered and analysed. In addition to effectiveness, perceived sophistication of CI activities is considered in order to understand how variations in system sophistication might link to the capacity of the CI process to have impact on decision-making.

3B. To identify how analyses potentially support management decision making

In addressing Objective 3B, the specific analysis tools that have been applied in firms will be outlined. By taking this further through the application of a scenario analysis approach, the researcher can address how predictive analysis links CI to market context analysis and how that feeds into management decisions.

The adoption of the three ‘lenses’ in this study offers insight into CI implementation and greater contextual understanding of the CI process.

1.5 Potential Research Contribution

This research potentially contributes to the understanding of CI processes in firms in three areas. Firstly, by structuring CI activities through a more comprehensive framework than in previous studies, this research aims to address the knowledge gap identified by Trumbach and Elofson (2007) through a more practical consideration of how analytic approaches in the firms may align with market conditions.

Secondly, clarity on the organisational structures that underpin CI activities was seen as an important knowledge gap by Wheaton (2012) and Handfield, Petersen, Cousins and Lawson (2009). This study intends to clarify the nature of those structures at firm level (e.g. analyst team organisation, degree of centralisation).

Thirdly, Trim and Lee (2007) argued that CI frameworks should be culturally and industry specific, which indicates a research gap in specifying the effectiveness of CI actions at sector level. This study seeks to address this gap by offering a sector-specific examination of the components of CI effectiveness.

Finally, Trumbach and Elofson (2007) identified the importance of aligning ‘organisational flexibility’ with ‘environmental turbulence’ as a key criterion for scanning the environment. This study potentially extends their work by adding a detailed examination of CI analysis methodologies and how this links to market level insights that may feed into decision-making.

1.6 Structure of the Thesis

The research is structured into eight Chapters.

Chapter 1 introduces the research focus and explains the research aim and objectives to provide a comprehensive view on the CI process in firms. Potential research contributions from each of the views on the CI process are then identified.

In **Chapter 2** the historical and economic context of the four large-scale telecom firms is identified by showing the main development of the four Swiss large-scale telecom firms and the importance of the telecom sector for the Swiss economy. The chapter concludes with a discussion of key competitive developments in the sector.

Chapter 3 shows the importance of CI processes with an overview of perspectives from previous research. Past thinking from the modular view of CI is reviewed and the knowledge gaps within that mind-set are identified. The systems perspective on CI is

acknowledged and systems elements are combined with modular or process elements to a preliminary framework. The importance of synthesis of CI with decision making in the context of market risk and firm-internal resilience is then discussed, as such factors are important for the volatile telecom sector. In considering organisational support for CI, past research on analyst team organisation, on explicit or implicit processes of CI implementation is outlined. Finally, elements that contribute to market level understanding (CI synthesis) are identified. A framework for the CI process (Figure 3.4) is developed that brings together traditional modular thinking and systems thinking into an integrative framework that addresses the three lenses noted above (operational, organisational and strategic). The chapter concludes by discussing the research focus and key research questions that will be pursued in the primary research undertaken.

Chapter 4 justifies the methodology, by identifying the key research choices made. The research aims and objectives are outlined and the research philosophy is justified. Elements of both an interpretivist and postpositivist approach are drawn upon in this research, thus leading to a pragmatist philosophy and a mixed methods approach in data collection (Tashakkori and Teddlie 1998). A case study approach is outlined as the main research strategy and a semi-structured interview is identified as the key method of data collection. In addition, the approach taken to the market context analysis using scenario analysis is identified. The patterns that arise from the analysis process will potentially show emerging themes (Onwuegbuzie, Dickinson, Leech and Zoran 2009) that are analysed using a content analysis approach and the chapter concludes by showing the planned data analysis for the study.

Chapter 5 initially offers an overview of the interview process and of the background of respondents and explains the focus on firm perspective. Thereafter, the chapter takes different perspectives on the nature of the CI process as observed across each firm – operational, organisational and strategic. The operational perspective offers an outline of CI Management activities and evidence presented by analysts themselves of the effectiveness of their CI processes and systems (CI Quality evaluation). The organisational perspective gives an overview of what has been found in terms of organisational structure and support (CI Organisation). Thereafter, the strategic

perspective draws out evidence of analysts' data gathering and analysis activities (CI Content) and any evidence of how that supports management decisions. The chapter concludes by discussing in CI Synthesis, the link between CI activities and management decision-making.

Chapter 6 focusses on analysing the context of the Swiss telecom firms. The chapter initially offers a brief overview of the competitive environment of the firms in the Swiss telecom sector. It then develops a detailed scenario analysis of the Swiss telecom market and identifies indicators for the market direction of that sector. By applying the identified indicators to a time series analysis, an external perspective on the market is gained and validated, which takes further the strategic lens of analysis. The chapter concludes by discussing implications from the scenario analysis with regard to analyst attitudes and analysis approaches.

Chapter 7 discusses key points to emerge from the findings, based on the three lenses of analysis. Through an operational lens, the key patterns of CI activity across firms and how that varies across developed and less developed CI processes are considered. The organisational lens discusses the variation in organisational support for CI, how this relates to stage of CI development and how it reflects explicit and implicit approaches to CI across firms. In adopting a strategic lens, the potential synthesis within the CI process is considered, in particular, the potential for integrated and dynamic systems elements to offer synthesis in CI analysis that are adopted. The chapter concludes by considering the variation in the nature of CI activity and the evidence of dynamic CI analysis.

Chapter 8 concludes the research by giving an overview of how the research objectives were met. Thereafter, the chapter shows the contribution to knowledge within the thesis, outlining how this study has extended past research. The chapter then emphasises those issues that are specifically important for managing CI activities in a way that integrates the day to day process perspective with the systems perspective. Limitations of the study are then discussed and the areas for future research are identified.

Chapter 2: Context of Research: Swiss Telecom Sector

2.1 Introduction

This chapter investigates the historical and economic context of the Swiss telecom sector. **Section 2.2** shows historical development of the sector since the telecom privatisation in 1998. **Section 2.3** discusses the characteristics of the Swiss telecom sector, notably technological developments, the current competitive positions of firms at the time of the research and their market performance. **Section 2.4** discusses recent developments in the telecom sector, notably the emergence of partnerships and how Swiss telecom firms are dealing with the need for innovative solutions. The chapter concludes by identifying the value in developing an in-depth understanding of the competitive intelligence activities of firms operating under such market pressures.

2.2 Historical Background

Three phases of historical development can be traced for the Swiss telecom sector; the first was the 'pre-liberalisation' phase before 1998 with a monopoly of the government owned PTT (BAKOM 2005). During the *first phase*, the Swiss telecom sector was regulated and under the monopoly of PTT. In this phase, telecoms were part of the post and telegraph services (PTT) with no possibility to grow based on its own profits, as they were increasingly used to subsidise other departments (Geschäftsbericht PTT 1996).

In 1998, the Swiss and EU telecom markets were liberalised, marking the start of the *second phase* (BAKOM 2005). For Switzerland, the telecommunications law, effective from January 1998 (Fernmeldegesetz 2010) permitted this liberalisation. This resulted in an increase in potential competition and price cuts (Elixmann *et al.* 2003). In the first year of liberalisation more than 100 new firms entered the market. The telecom price index decreased from 140% in 1998 to 100% in 2000 (Elixmann *et al.* 2003). The burst of the Internet bubble led to a drop in new entrants as the index dropped to 100.

In 2002, a further increase to 340 firms was registered, marking the start of the *third phase* (Elixmann *et al.* 2003), but this rapidly led to a decrease in profits (Vaterlaus, Bühler, Telser and Zenhäusern 2004). Shifts in ownership (as occurred in Cablecom); the emergence of mergers (as evident with Sunrise), and internal organisational shifts among some original competitors who were linked to the old PTT, led to the formation of Swisscom Ltd. (Swisscom 2011a). On the one hand, the corporate identity and organisational structure were adapted, and, on the other hand, Swisscom was now able to offer the latest technologies (fibre net) and product bundles (Swisscom 2011a). After 2005, telecoms firms aimed for strategic partnerships (Sunrise 2011a; and Cablecom 2011a), and mergers (Swisscom 2011a). With the launch of phone apps, the mobile phone providers Swisscom, Sunrise, and Orange (Salt.) started collaborations with MVNO, in order to offer apps as MTV on their mobile phones. Despite this planned growth on the part of all competitors from 2005 onwards, the telecoms sector had become a saturated market by 2010 – the starting point of this study (Brändle *et al.* 2012) (see Table 2.1).

Table 2.1: Market Shares (as ratio of revenue to market value for Swisscom, Sunrise, Orange, and Cablecom (Big 4) compared with leading providers EU-27)

Market Shares Products	Swisscom	Sunrise	Orange	Cablecom	Market share Big 4	¹ Total CH	⁶ EU-27
Revenue in M. £	² 8,001	³ 1 334	⁴ 864	⁵ 737	10 936 *	11,300	526,524
Market share in %	¹ 52.2	¹ 11.8	¹ 8.5	¹ 5.8	78.3	100	100
Employees (FTE)	² 19,480	³ 1 505	⁴ 1,145	⁵ 1,400	87.3 **	26,959	1,171,200
Internet in %	¹ 53.2	¹ 10.2	⁴ < 0.6	¹ 17.1	80.5 to 81.1	100	⁶ 5.2
ISDN, VoIP in %	¹ 61.4	¹ 14.3	¹ 0	¹ 8.1	83.8	100	:
Mobile Phone in %	¹ 60.3	¹ 19.4	¹ 16.7	-	96.4	100	⁶ 37.8
Fixed network in %	¹ 68.3	¹ 11.0	¹ 0	¹ 7.6	86.9	100	⁶ 63.3
TV Subscribers in %	² 6.6	¹ 0	¹ 0	⁵ 44.2	50.8	100	:

Sources:

¹ Brambilla 2010

² Swisscom 2010b

³ Sunrise 2010

⁴ Orange 2010

⁵ Cablecom 2010a

⁶ ETEC and OFCOM (2010) Market share of main provider

* With 10,936 this number was estimated too high, as Brambilla (2010) measured just those FTE being occupied for telecom services, while the Big 4 include further services

** For the same reason 87.3 % for Big 4 in 2009 this number was estimated too high

: Data not available

2.2.1 Historical Development of the four large-scale Swiss Telecoms

The history of the telecom sector is, above all, the history of Swisscom, which is the market leader, followed by the other three large-scale Swiss telecom firms. Table 2.1 shows that Swisscom market share was approximately 80% of the total Swiss telecom market. Key milestones in the development of the Big four telecom firms are shown in Table 2.2 overleaf. In 2015 Orange was overtaken by the French entrepreneur Niel (NZZ 2015) and changed its name to ‘Salt.’. This change of name enables the company to save licence fees for their brand name Orange. Table 2.2 shows that entries into the market took place in 1994 (Cablecom for Internet services), in 1996 (diAx, which was the former name of Sunrise for mobile phone services), in 1998 (Swisscom LTD for Internet service, in 1999 for mobile phone services), and in 1999 (Orange for mobile phone services). Key mergers and acquisitions also took place in 1998 (Cablecom bought SwissOnline), 1999 (Swisscom bought Debitel), 2000 (Swisscom bought UMTS), 2000 and 2001 (diAx merged with Newtelco, and diAx merged with Sunrise), 2003 (Cablecom was sold), 2005 (Swisscom merged with Bluewin, Cablecom was sold), 2007 (Swisscom bought Fastweb), 2008 (Sunrise bought Tele2), 2009 (Sunrise sold Tele2), and 2010 (Sunrise was sold to CVC). In total, eleven mergers and acquisitions occurred between 1998 and 2010, with an average of approximately one merger or acquisition per year. This is a rather high number, when compared to other sectors, such as the pharmaceutical sector where mergers are rare. Only one noticeable merger in that sector occurred in that period – that of Sandoz and Ciba-Geigy in 1996 resulting in the new founded Novartis (Novartis 2011).

The mergers within the telecom sector have been noted in the brief chronological overview in this Section and the other landmarks in the development of the four large-scale telecom firms are outlined in Table 2.2 below.

Table 2.2: Historical development of the four large-scale Swiss Telecoms

Year	Swisscom	Sunrise	Orange	Cablecom
1994	1993 to 1996 "Telephone" was renamed in "Telecom PTT"		Start in the UK mobile communication market as subsidiary from Hutchinson Whampoa (main shareholder) and British Aerospace	Start from a merger from various independent cable network operators with the name Balcab
1996	Start of diAx from electrical companies Atel, BKW, CKW, EGL, EOS, and NOK, start of Newtelco from UBS and Migros			
1997	Start with new name Swisscom	BT and Tele Denmark invest in Newtelco and found the brand "Sunrise"	Orange starts to offer fixed network in Switzerland.	
1998	Start as a public company	First to offer Internet- and language services for a local price		Acquires internet service provider SwissOnline
1999	Overtake of majority of Debitel		Orange Communications S.A. enters the Swiss market	First Swiss company to offer broadband internet services
2000	Overtake of UMTS concession (£ 30 M.)	Tele Denmark overtakes majority of Newtelco and diAx, merge to Sunrise Communications Inc.		Swisscom, Veba, and Siemens sell Cablecom to British-American company NTL
2001	Strategic collaboration Swisscom Mobile with UK Vodafone. Start of Swisscom Ltd.	diAx merges with Sunrise to TDC Switzerland Ltd with brand Sunrise	Over 12 mio customers in UK, and over 30 mio worldwide, fastest growing operator for the last 18 months, operating interests in 20 countries worldwide, with 13 in Europe	
2003	Largest refinancing transaction in Swiss economy, NTL sells Cablecom to banks and private investors (Apollo Management, Goldman Sachs & Co, Tower Brook Capital Partners)			
2004		Revenue over £ 1.3 bn		
2005	Merger of Swisscom fixed network and Bluewin	Strategic partnership Sunrise and Cablecom for mobile phone, overtake of Ascom Business Communication Switzerland, which becomes Sunrise Business Communication (SBC)		Liberty Global Inc. (LG) acquires 100% share for Cablecom.

Year	Swisscom	Sunrise	Orange	Cablecom
2006	Launch of Bluewin TV, entry in TV market	National roaming agreement of Sunrise and Tele2		Common operations of Cablecom and UPC broadband (European cable network group of LG)
2007	Aquisition of Italian Fastweb (£ 4.6 bn): new technologies, IPTV	Liberalisation of “last mile”. Sunrise starts to build infrastructure in Switzerland for non-bundled products		Total sales over £ 670 M. for the first time.
2008	Reorganisation Swisscom Switzerland (Residential Customers, SME, and Corporate Business divisions)	Sunrise overtakes Tele2 (fixed network) and offers unbundled products for the “last mile”.		
2009		Sunrise sells Tele2 mobile phone sites to In&Phone. Merger planned between Orange Switzerland and Sunrise.	Partnership with Globus (a Swiss warehouse chain) and opening of 12 Orange centres.	Launch of fibre power services.
2010		CVC Capital Partners buy Sunrise from TDC for £ 2.2 bn. Sunrise launch MVNO mobile offers with daily newspaper “20 Minuten”, MTV, and Finecom, WEKO prohibits the merger of Sunrise and Orange		New corporate identity to UPC Cablecom. Launch of DigiCard enabling digital TV without set-top boxes. Offer of free Internet connection to every household with a cable connection.
2012	License auction			
2013	CEO Carsten Schloter dies New CEO is Urs Schäppi			
2014			Niel - upcoming owner of Orange - intents to lower prices for mobile bundles	
2015			Sold and changed name to “Salt.”	

Sources: Swisscom 2011a; BAKOM 2011; Sunrise 2011; Orange 2011a; Orange 2011b; Orange 2011c; France Telecom 2011; Cablecom 2011a; Tagesanzeiger 2012; OFCOM 2012; Bilanz 2013; Swisscom management 2015; Salt interview 2014

There has been, as seen in Table 2.2 above, an evolution in services provided by key players in the market. During the *first phase* (before 1998), Cablecom offered Internet services, and the former Swisscom, named Telecom PTT, offered fixed network services. In 1996, mobile phone services were offered from diAx and shortly after from Telecom PTT and Orange, therefore mergers enabled them to offer more products. Mergers within the *second phase* (1998 to 2000) were based on competitive attempts to expand and to sustain price competition with new competitors. The growth strategies adopted in the second phase had not been successful due to the increased competition. Mergers within the *third phase* (2002 to 2005) can be seen as takeovers (e.g. Cablecom) or as attempts to gain market share (e.g. Swisscom), in order to compete in a market where there was both price stagnations and increased competition. Within this third phase, mergers included initiatives by telecom firms to enter into international markets (e.g. Swisscom), or strengthen the financial position (e.g. Sunrise) with the strategic aim to grow in a more planned way. By 2010, the telecom market had evolved rapidly in terms of technological change (BAKOM 2011), had high entry barriers (frequency licenses, infrastructure), and price restrictions (competition), with customers demanding the latest technologies (fibre net, digital TV) and services (product bundles). Mergers or acquisitions between firms that complete each others' service lines to potentially marketable services constituted an advantage over the direct competitors in the saturated telecom sector (Porter 1980; BAKOM 2005).

2.3 Characteristics of Sector

As discussed above, a high number of mergers and acquisitions characterise the telecom sector. Even though BAKOM (2005) mentioned a high number of new participants, by 2010, the market was an oligopoly market with the Big 4 holding a market share of about 78.3% (Table 2.1). This was a consolidation phase with four or five firms dominating over 60% of the market, according to Shaw's (1996) categorisation. The development pace of the products and services is high. While and Internet connection (quite slow) in 2000 cost about £35 or CHF 50 per month (researcher's own experience), in 2010 a fast Internet connection was free. New offers of devices, bundled

offers of mobile phone with Internet connection, and faster Internet connections with faster download speed are now the norm.

In terms of scope of business, Swisscom, Sunrise and Orange hold frequency licenses for mobile phones (BAKOM 2014). Swisscom does business in the areas of telecommunication (core business), medias as TV, Internet, and new issues as electric vehicles. Swisscom is the largest Swiss telecom provider. It does also business in Italy through a 100% daughter Fastweb (Fastweb 2011). Sunrise does business just in Switzerland in the areas of mobile phone, fixed network, and Internet. It is the second largest communications provider in Switzerland (Sunrise 2010). In Switzerland Orange does business in the areas mobile phone and Internet. It is the third largest mobile phone provider in Switzerland (see Table 2.1). Cablecom is the largest provider for TV in Switzerland with headquarters in the Netherlands (Cablecom 2010a). It does business in the areas of cable TV, fixed network, MVNO mobile net, and Internet (Cablecom 2010b). All four provide their services to private and business customers along with call centres for customer support. Despite a rather small product range, the firms provide about 3% of the Swiss GDP.

BAKOM (2011) noted both a diversification in services and a change in tariff policies of operators between 2005 and 2010. In terms of diversification, customers have choices within a range of widely differentiated services (timed or unlimited Internet connection, cheap or for free local calls along with higher priced international calls or cheap international calls for different monthly rates). In tariff policies, each of the operators offers different prices and contracts. Phone shops show an overview of the prices for each of the Big 4 operators – customers choose an operator contract along with buying a new mobile phone. The variation in prices and service offers also holds true for the bundling of TV, fixed network, and Internet services, which can be seen at the operators' web sites. Customers can choose to change the operator at the end of their contract period.

Apart from the Big 4, small firms are in the market for local customers. Table 2.3 shows the number of providers in the market. For example, in 2009 a rather high number of

Internet (175) and fixed network providers (81) were active, but the market shares of the small providers were rather low.

Table 2.3: Number of Providers for each Product in 2009

Products	Providers	Number of Providers 2009 (Brambilla 2010)	Providers without Big 4	Market share other providers
Internet		175	171	18.9 % to 19.5 %
Mobile Phone		12	9	3.6 %
Fixed network		81	78	13.1 %
TV subscribers		124	122	49.2 %
TV subscribers fibre net		Available in 2012	-	-

2.3.1 Technological Developments

Comparing the telecom market from the time before the liberalisation (1998) with 2010, technology has had a major impact on services offered (see Section 2.2). Up to 1998, only Swisscom offered fixed network services (Swisscom 2011a). Internet services from Cablecom had a much slower capacity and cost about 10 times more (Cablecom 2011a). From 2010 onwards, there was a choice of fixed network providers along with different service options (free calls all over Switzerland, or cheaper international calls), and customers can choose between slow or fast Internet capacity (Swisscom 2011c; Sunrise 2011b; Orange 2011d; Cablecom 2011b). New offers arise steadily – Cablecom made an offer in 2010 for free Internet connection with a slower capacity to every household with a cable connection (Cablecom 2011b). It is possible that other telecom services with basic capacity may be offered for free within the next few years, as the newly offered for free digital TV connection (Cablecom 2011b). This is comparable to free daily newspapers (20 Minuten 2011) or music and films (Youtube 2011) making their revenue from advertisement.

Even though the Swiss telecom firms provide solutions to use the phone and Internet, they have not developed quickly in technological terms (from interviews with Big 4, Swisscom 2011c; Sunrise 2011b, Orange 2011d; Cablecom 2011b). They offer solutions developed by providers of devices (for example Macintosh), or make contracts with MVNOs for new offers (for example Sunrise and MTV). Some offer bundle services (for example fixed network, TV, and Internet from Swisscom and Cablecom),

with each of the products also available in an unbundled form as regulated from the government BAKOM (2014). They apply for but rarely develop their own patents (Interview with analysts of Big 4).

Telecom market regulations are of main relevance for the telecom firms. Orange’s analyst reported to regularly watch changes of regulations:

“There are some regulatory events that will happen frequently that will trigger probably everything.” (Analyst 5, Orange, date of interview 20/10/2010)

Areas of regulation concern the telecom market and customers.

Market regulations are to avoid monopoly power (Report Federal Council 2010) by regulating mergers between telecom firms and to allow effective competition between the telecom players (Fernmeldegesetz 2010). Regulations for consumer protection protect consumers from handy rays (Umweltschutzgesetz 2004), regulate to provide reliable solutions for basic supply without disruption (Fernmeldegesetz 2010), and to protect customers of telecom services from mass commercials (Fernmeldegesetz 2010).

2.3.2 Revenue and Market Shares of Swiss large-scale Telecom Firms

Figure 2.1 shows the development of revenue of the large-scale Swiss Telecom firms.

Figure 2.1: Revenues for Swisscom, Sunrise, Orange, and Cablecom

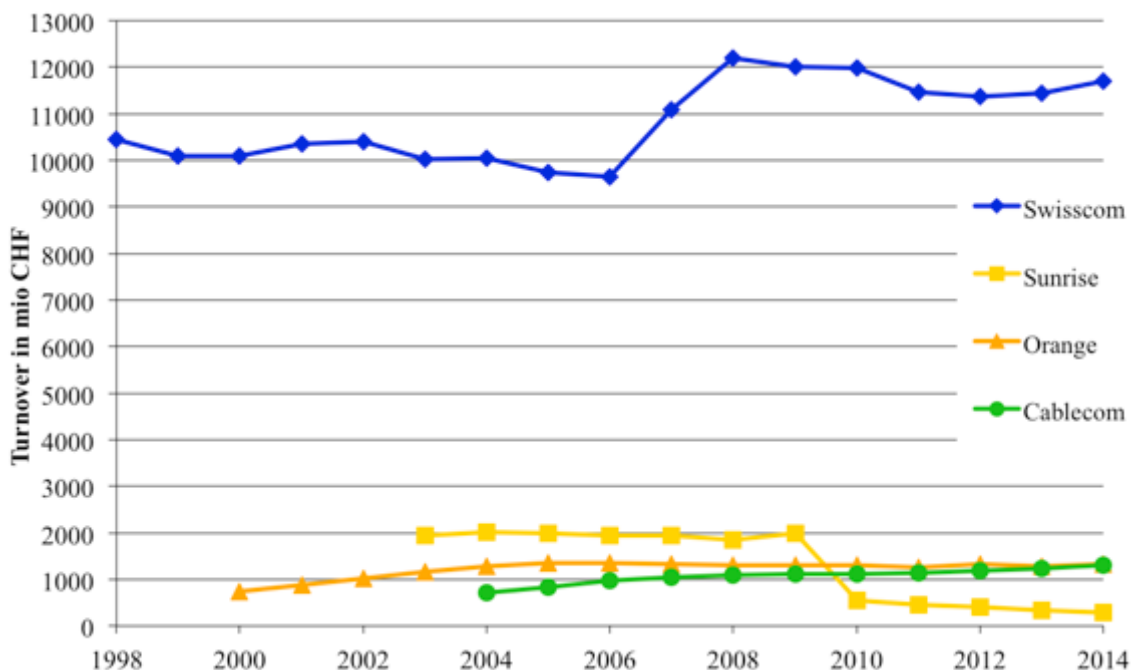


Figure 2.1 shows that Sunrise, Orange, and Cablecom only revealed digits for the years 2003 to 2010 (Sunrise), 2000 to 2010 (Orange), and 2004 to 2010 (Cablecom) even though these firms are longer in the market (Sunrise since 1996, Orange since 1999, Cablecom since 1994). Digits for the missing years were publicly not available also not on request to the firms. One reason could be the many mergers and acquisitions of the firms as described in Section 2.3.

Figure 2.1 shows that the revenue of Swisscom showed a steep upward slope for the years 2006 to 2008 followed by a decline for 2009. One reason for the upward slope could be the launch of Bluewin and the acquisition of Fastweb. The reorganisation was the starting point of the decline (compare with Table 2.2). From 2009 to 2010 Swisscom's revenue decreased -0.1 % (absolute: £ -9 M.) (Swisscom 2010c). The other three firms had the following growth rates from 2009 to 2010: Sunrise + 2.5 % (absolute: £ 34 M.) (Sunrise 2010), Orange -0.08 % (absolute: £ -1 M.) (Orange 2010), and Cablecom + 1.3 % (absolute: £ 9 M.) (Cablecom 2010a). One reason could be that Swisscom is the largest company and a growth rate in the range of the others would mean that they had to gain a large amount of market share from them. Because Swisscom invested highly in their physical networks this is unlikely. Reason for declines in that period of Swisscom and Cablecom are investments in networks.

2.3.3 Market Performance of main Providers

The Big 4 made a total of CHF 16,404 M. or £ 10,936 M. (see Table 2.1), which was about CHF 0.5 bn lower than the estimated total market value of CHF 17,000 M., which indicated that the revenue of the Big 4 was about 96% of the Swiss telecom market. This estimation was too high, as also other services than telecoms were included in this estimation. Brambilla (2010) estimated the market value for 2009 as CHF 16,582 M., but due to the fact that these digits were of provisory nature, a differentiation between TV program providers and TV connection providers was not explained, the market value was estimated as CHF 17,000 M. Brambilla (2010) provided the market shares of main products of the Big 4 as 78.3 %, which appears too low, as not all products are shown in Table 2.1. Therefore, a realistic estimation of the market share of the large-scale Swiss telecom firms is between 85% and 95%.

Swisscom is the most important provider of telecoms and IT services in Switzerland (Swisscom 2010b; Metzger 2008). Following a reduction in Swisscom’s market share of fixed network and mobile phone due to the liberalisation and market entry of competitors, these shares have stabilised at about two-thirds of total market value. Swisscom gained customers due to their high-speed Internet offers, and now remained largest supplier for Internet. A comparison of the market shares for their main products is shown in Table 2.4. Mobile phone, TV, and Internet market shares from the leading providers of EU-27 were used to compare the results (Eurostat 2010).

An alternative expression of market share ratio to number of users revealed different digits for Switzerland (ETEC and OFCOM 2010). These were for mobile phone Big 4, and InPhone (only business): 62.3 %, and for Internet Big 4: 60.2%. This second method to calculate market share did not include weights in terms of number of calls and amount spent for calls. Metzger (2008) presented differing results (Table 2.4) for the mobile phone market for 2007 comparing the market shares of the main providers with the corresponding average shares of EU-27. Market shares for the other telecom products were not provided as no comparison with the overall market share digits were available. Even though slight differing results were seen, as Eurostat (2010) data are based on 2007 values, the results confirmed those in Table 2.2, as differences of market shares were within a 2% range for mobile phone between 2007 (Table 2.4) and 2008/09 (Table 2.3).

Table 2.4: Market Shares 2009, 2014 Swiss Telecom Providers and EU-27

Market Shares	Swisscom	Sunrise	Orange	Cablecom	Market share
Mobile Phone 09	60.2 %	19.4 %	16.7 %	MVNO	> 96 %
Mobile Phone 14	54 %	27 %	18 %	MVNO	99 %
TV subscribers 09	6.6 %			44.2 %	> 50 %
TV subscribers 14	26 %	2 %	Zattoo TV	50 %	78 %
Internet 09	53 %	10.1 %	< 1 %	17.1 %	> 80 %
Internet 14	54.3 %	9.4 %		20.9 %	84.6 %

Sources 2009: Brambilla 2010; Swisscom 2010b; Cablecom 2010a. Sources 2014: Sidler 2013; Comcom 2015; Eurostat 2010.

Borner, Mohler and Saurer (2010) stated that further regulation of the Swiss telecom market is not necessary to avoid a monopoly in the Swiss telecom market. The results (see Table 2.3; Eurostat 2010) indicated that the mobile phone market share of Swisscom as the incumbent service provider was about 1.5 to 3 times higher as of EU-27 or UK. One reason for this difference could be that small countries as Switzerland need less providers due to their size and to the high entry barriers into the telecom sector being compared to the small size of the country with the rather small number of possible customers, making it less attractive for new entrants to join the market. A comparison with market shares of mobile phone and fixed network of other small countries as Austria (52% fixed network, 43% mobile phone), Belgium (62% fixed network, 44% mobile phone), or Cyprus (69% fixed network, 82% mobile phone) support the above arguments (Eurostat 2010).

Borner *et al.* (2010) argued that there are no monopolies in the Swiss telecom market due to the fact that all services can be offered from alternative providers. This argumentation stood in contrast to the arguments presented by ETEC and OFCOM (2010), who claimed to evaluate, if a change of regulations should be undertaken to prevent monopolistic powers. The high entry barriers to the telecom market (i.e. frequency licenses, fibre cable) prevent smaller firms to enter the telecom market especially in a small country as Switzerland. Cablecom's operative analyst explained during the interview that a new entrant into the telecom market with an own frequency license would be observed within the long-term strategic plan.

"We are in a market that costs a lot of money to roll out a mobile or fix network and I guess Swisscom is dated to spending 6 billion in the next few years to roll out 80% of the population and connect them to fibre network, it is not that some competitors are popping out of nothing, and giving us a hard time. It is long term and strategic, with heavy money involved." (Analyst 6, Cablecom, date of interview 10/11/2010)

This study supports the view of Borner *et al.* (2010) that there is no need for further regulations to prevent monopolistic structures, as the actual competitors are highly competitive, while new entrants with own licences are less likely (licence fee auctions and high entry barriers).

2.4 Partnerships and Organisational Learning – Key Role for CI

This section takes the ideas of Kurtinaitiene and Gaizutis (2008) on three criteria for business development (partnership, learning and innovation) and applies this to the large-scale Swiss telecom firms to discuss how they deal with implementation of innovative solutions from 2010 onwards. Kurtinaitiene and Gaizutis (2008) investigated the link between market orientation, innovation, and organisational learning of the mobile telecomm sector. They found that faster implementation of innovative solutions in the mobile telecomm market can be achieved through *global partnerships*, market orientation as indicator for *organisational learning*, and encouraging *innovations*.

Swisscom tried to expand internationally by buying other companies (Section 2.3.1). They were successful with buying the Italian company *Fastweb*, but earlier, the Swiss government – the main holder of Swisscom’s shares – did not allow expansion to Ireland (Handelsblatt 2006). Swisscom offers partnerships for SMEs in order to expand their services (Swisscom partner 2014). Government restrictions on expansion apply in terms of antitrust laws in relation to the other telecoms. When Orange sought to merge with Sunrise, this was prohibited by the Swiss antitrust commission (WEKO 2010).

The history of the Swiss large-scale telecom firms shows that numerous partnerships, mergers, and takeovers have happened in the past – as summarised in Table 2.5 below.

Table 2.5: Alliances of Swisscom, Sunrise, Orange, and Cablecom

Year	Type of Alliance
2001	Strategic collaboration of Swisscom mobile with UK Vodafone
	Merger of diAx with Sunrise
2005	Merger of Swisscom fixed network with Bluewin
	Strategic partnership Sunrise and Cablecom for mobile phone
2007	Swisscom acquires Italian Fastweb, goes into new technologies
2008	Sunrise overtakes Tele2
2009	Sunrise sells Tele2, plans merger with Orange
	Orange partners with Globus in 2009
2015	Orange is sold to Niel and changed its name to Salt.

Swiss telecom firms do not seek global partnerships but prefer alliances with direct rivals or to extend their product ranges. The focus of firms on their own telecom market

– partly explainable by the regulations of the market and the competition – is ongoing, as shown in Table 2.5 above. The rivalry of the firms for the saturated market requires them to carefully plan their strategy aligned with the market. The analyst of Cablecom explained the importance by stating:

“The strategy process has become very important it needs to align for competitors on the local market, it needs to align to the regulatory situation.” (Analyst 7, Cablecom, date of interview 29/12/2010)

Understanding the competitive market and aligning this knowledge with firms’ strategy is the core issue of CI (Jaworski and Wee 1992). The analyst’s statement shows the importance of CI for the Swiss telecom firms. The past developments and recent activities indicate that future developments in the market are likely to go in a similar direction, characterised by technological innovation and organisational responses in a saturated market. In the period of this study, (2010), fierce competition indicated that firms had to be market oriented to fight for market share, due to the saturated Swiss telecom market (BAKOM 2005; Brändle *et al.* 2012). This saturation also required firms to focus strongly on competitive threats.

The investment in competitive and market analysis in all four firms expanded in the period 2005 to 2010. The examples illustrate the increased investment of the firms in CI and competitive analysis. Swisscom’s strategic analyst, who reported on their CI process back in 2006 indicated that he was responsible for doing CI in his department.

“It is usually the responsibility of the analyst to observe [and analyse] the market.” (Analyst 1, Swisscom, date of interview 12/02/2010)

In developing CI in Swisscom, the strategic analyst who reported about their CI processes in 2010 explained that he conducted CI in a team.

“The whole thing is decentralised to be close to the [internal] customers. ... our team is newly called Market Intelligence.” (Swisscom, date of interview 14/04/2010)

If a new possibly dangerous competitor enters the market, the analyst identified that:

“[It] depends on the market entry strategy of the new competitor entering the core market of the new competitor. “[We] possibly launch a similar product.” (Swisscom, date of checklist 14/04/2010)

Furthermore, the follow up interview undertaken in 2015 with Swisscom’s strategic analyst showed that Swisscom made huge efforts to refine their CI process, especially their way to communicate supported by a newly adapted information system.

There is a new central portal for knowledge management. (Swisscom, date of Mail 10/11/2015)

The analyst explained that they worked with scenario analyses.

“For example, to picture and deepen possible scenarios of consolidation.” (Swisscom, date of Mail 10/11/2015)

Cablecom’s strategic analyst reported that they had employed a strategic function shortly before the interview in 2010, responsible for doing CI additionally to their previous attempts to analyse the market.

“We were pretty much concerned 5 years ago about our strong growth, but the growth was sometimes not very strategy directed. ... This has improved a lot as we recently introduced three years ago a strategic function, which is in charge of monitoring the general direction that Cablecom is heading to.” (Cablecom, date of interview 29/12/2010)

The degree of organisational learning as stated by Kurtinaitiene and Gaizutis (2008) is important in highly competitive markets. This study seeks to examine how each firm approached their organisational learning in the area of competitive intelligence.

Examining these four firms and their approach to gathering CI, developing CI and implementing CI can be a fruitful study, as it enables researchers to focus on CI activities in a rapidly evolving market which demands rapid competitive response. The approach to CI within these firms can offer useful insight into where CI fits with organisational structure and how market change demands adaptive competitive intelligence structures.

2.5 Summary of Chapter

This Chapter has drawn out factors that characterise the Swiss telecom market. The historical background has shown how the Swiss telecom firms emerged as a result of the privatisation process. The characteristics of the market have revealed that the high technological pace is a result of market saturation. An overview of the performance of each main telecom firm followed that insight. It was then argued that learning processes are core to the firms, due to their organisational changes and partnerships. The chapter concluded by explaining how CI is highly relevant for the large-scale Swiss telecom firms.

Chapter 3: Theory Development: CI Process

3.1 Introduction

In this chapter, key theoretical perspectives on CI are set out. **Section 3.2** offers an overview of some of the challenges in defining CI, noting some past definitions and common views of the scope of CI activities. **Sections 3.3, 3.4, and 3.5** then examine the elements of CI in detail, through the categorisation of CI Activities and the link to knowledge management. **Sections 3.6 and 3.7** identify elements that potentially influence the CI process in firms, such as organisational structure. **Section 3.8** offers an integrated framework of CI activities that brings the modular and systems view together under three lenses (operational, organisational, and strategic). **Section 3.9** outlines how that theoretical focus is taken forward in the research questions. **Section 3.10** summarises the chapter.

3.2 Challenges in Defining CI

Brody (2008) discussed the term CI and investigated how CI is perceived. She argued that the lack of an agreed definition was inevitable as: “*developing fields (as CI) struggle with variants in terminology and understanding.*” Brody (2008) found that CI was mostly described as a process or product. The process aspect emphasises activities undertaken in regard to CI and the product aspect looks at the process outcomes, and tools, which is the choice of analyses, toolkits, and information systems that support the activities undertaken for CI. In contrast, Businessdictionary (2014) defines CI as the:

“Continuous process of monitoring a firm’s industry or market to identify (1) current and future competitors, (2) their current and announced activities, (3) how their actions will affect the firm, and (4) how to respond. It differs from industrial espionage in that it uses legal and ethical means to gather and sift the publicly available information.”

Businessdictionary (2014) emphasises the activities undertaken to analyse markets and the decision aspect, paying less attention to organisational perspectives on CI.

McGonagle and Vella (2012) differentiated between strategic, competitor, market and technical intelligence and structured CI into strategic and operational, organisational and technological, and competition related activities. All activities are interrelated and necessary in accomplishing CI tasks.

Gainor and Bouthillier (2014) emphasised the benefit of CI for decision making and the need to measure CI performance in regard to CI process and performance in terms of resulting decisions. This PhD study sees that both, the CI process in firms and performance are interlinked, because CI processes result in activities that lead to a specific performance. For the CI process these activities are on the one hand conducting analyses that are communicated for decision making and the analyses are conducted in a specific way that is shaped from firms' organisations.

3.2.1 Key Perspectives on Scope of CI Activities

Prior research has shown different categorisations of CI activities, notably, some fundamental conceptualisation of the nature of the CI process, which sets out critical actions that are part of the CI process (Choo and Bontis 2002; Derlei and Altun 2013), the module perspective, which identifies key CI tasks or elements (Prescott 2003; Dishman and Calof 2008); and the key intelligence topics approach (Herring 1999). Each approach is briefly discussed.

The CI process – as any other process – consists of input, transformation, and output. The output serves as input for the next stage until a goal is reached (Businessdictionary 2010a). Choo and Bontis (2002) identified knowledge creation, transfer and utilisation organisational process within their framework for strategic knowledge management of intellectual capital. The CI process has therefore organisational and knowledge elements, as it deals with the transformation of data about competition into actions of the firm. Specific topics relevant for the CI content are innovation, exploitation and exploration. Dereli and Altun (2013) identified a technological innovation process containing a discovery ('invention'), commercialisation ('innovation'), and imitation by competitors, focussing on the competitive market. Aspara, Tikkanen, Pontiskoski and Jarvensivu (2011) suggested an exploitation and exploration concept, analysing internal data for learning purposes (exploitation), and external data for product development purposes (exploration), which relates to the CI process. They stated:

*“**Exploitation** refers to the use, refinement, and extension of a firm's current knowledge, resources, and capabilities, while **exploration** refers to the firm's search for, discovery of, and experimentation with new alternatives.”*

Aspara *et al.* (2011) sought to combine innovation with the CI process when stating:

*“Markets and customers and **market actors’ knowledge** of and bonds to the firm – as viewed **in combination** with ... technologies, processes, and products.”*

Overall, the CI process concentrates on activities relevant to improve competition.

What the above discussion of the nature of CI activities highlight is how CI is linked, on the one hand, to strategic knowledge management, to the exploitation of market actors’ knowledge but it is also linked, on the other hand, to innovative processes. Davenport (1994) identified the knowledge management process that captures, develops, shares and effectively uses organisational knowledge. The CI process is conducted in firms and therefore related with knowledge management (see Section 3.4). Furthermore, Davenport (1994) pointed at organisational knowledge and effectiveness, which this PhD study seeks to understand how the organisational context supports the CI process.

Among similar approaches to the CI module or phases view (Bouthilier and Jin 2003; Prescott 2003; Fuld 1995), two are explained. Prescott (2003) identified the following phases or modules of a CI process: planning and focus, collection, analysis, communication, and decision. Dishman and Calof (2008) took the same view but changed one step: *intelligence process and structure*, collection, analysis, communication, and decision. They claimed that organisational awareness and culture supports the whole process. Both approaches have in common the identification of a distinct sequence of steps of CI process activities. McGonagle and Vella (2012) recently outlined a similar breakdown of sequenced CI activities, such as identifying, collecting and analysing data concerned with competition. When describing a CI process, they saw it as firstly, an activity to identify information needs from decision makers about the competition, secondly the collection of relevant data, thirdly, an analysis of the data and fourthly, communication of the data analysis outcomes to decision makers.

What the CI module view offers that was perhaps not addressed in the strategic knowledge management orientation of Choo and Bontis (2002), is the focus on data that emerges from the market context of the firm that relates to competition (Jaworski and Wee 1992). The CI module view can be seen as an application of information management, which is concerned with information processes (Heinrich 2005), where information management covers all issues relevant for the firm, such as IT, human resources, finances, controlling, and production.

Herring (1999) recommended a *key intelligence topics* view. His approach first identified key intelligence needs of a firm by going through a so called ‘management-needs identification process’, which emerged in dialogue with key decision makers and was an important initial CI activity. This focus on intelligence topics is also addressed, in part, in the module view which included this aspect of setting out the intelligence priorities in the ‘planning and focus’ task (see Prescott 2003); which deals with identifying specific intelligence requirements (Krizan 1999; Weiss 2002). An echo of this thinking is evident in the work of McIntosh *et al.* (2011), who noted that it is crucial to focus on ‘what problems to solve’ when designing systems. Similarly, Sangar and Iahad (2013) saw it as a critical success factor to identify key intelligence topics for designing a business intelligence system. Deltl (2013) saw the identification of key intelligence topics as a basic facilitator of CI.

“Adhering to a definition phase and key Intelligence topics as well as key Intelligence questions sharpens our focus and prevents an information overload.”

When describing a CI process, it has been noted above that McGonagle and Vella (2012) saw it as first activity to identify information needs from decision makers. Thus, this research sees it as important to identify intelligence needs in accordance with past thinking when assessing firms’ CI activities.

3.3 CI Management: Key Elements of the CI Process

The above discussion has identified both, some challenges in defining CI and variation in how the CI process is conceptualised in past studies. Now, it is useful to look at a breakdown of CI actions and tasks in order to gain understanding of what is involved in CI activities at firm level. Four elements that have been commonly acknowledged as key CI activities or functions include a) planning and gaining focus; b) data gathering and analysis; c) communication of data analysis outcomes; and d) link to decision-making.

3.3.1 Planning and Gaining Focus

Ferrier (2001) put the competitor view at the centre of his definition of strategy, viewing it as “a *sequence of competitive actions carried out over time.*” When planning competitive actions, selectivity is important and this is also true of CI activities. Krizan

(1999) emphasised the need to relate CI requirements to what is most relevant for customer management and market performance. In his view, ‘requirements’ mean to define the problem and to build the plan for the CI analysis to match requirements. In this study the term ‘requirements’ applies to all CI intelligence needs while the term ‘query’ is sometimes used to describe how firms focus on an actual CI problem in their CI analysis. Having identified a CI issue, the task ‘gaining focus’ deals with defining how to organise the CI process to generate data around this CI issues, often in the form of a CI query. Dishman and Calof (2008) explained this step as:

“[CI is about] focus on issues of highest importance to management. This phase is required to set required resources for the CI project or process as well as to establish the purpose and result of the findings. It is during this phase in which the assessment of what intelligence is required for the managerial decision which is under uncertainty.”

‘Focus’ can be reached by setting priorities (Porter 1980; Herring 1999). ‘Planning’ establishes the purpose and defines the required sources (Gilad 1989).

3.3.2 Data Gathering and Analysis

Data gathering and analysis are connected, as analyses are based on specific data types and specific CI issues. Data gathering includes the assessment of the usefulness of the data for analysis (DeVault 2011) and this is linked to CI scanning. Information systems are platforms to support CI scanning by structuring the gathered data (Turban, Aronson, and Liang 2005). Qiu (2008) found that the attitude of managers to solving problems (process, practice, decision making) impacts CI scanning or gathering, and CI scanning impacts competitive advantage. The scanning cycle consists of some interrelationship between managerial business motivation, intelligence scanning and sense-making. Keszey (2011) explored how managers can better understand CI information, noting how data quality from trusted sources and studies, aiming at specific CI problems lead to better CI learning. In contrast, poor data quality (Rohr 2011) can lead to CI analysis bias. Tanev and Balletti (2008) found that information needs are related to variation in innovation performance across different firms (ranging from supplier technology-dominated companies; large-scale producers; specialized suppliers; and science-based companies). They found that competitor and industry information was least considered and applied but highly relevant for firm performance, which this PhD study sees as highly relevant as well. This importance of relevant contextual information was highlighted in other studies, for instance Molnar and Strelka 2012; Rohrbeck 2010;

Lavbic, Vasilecas and Rupnik 2010; when investigating collaboration in a network of analysts, showed how analysis results varied according to how well relevant focus and CI issues had been identified prior to data gathering.

Analysis is central to CI activity; Draghici (2011) used the term CI as denoting ‘analysis of competition’ and Fleisher and Bensoussan (2003; 2007) viewed analysis as the core activity of CI. In considering analysis, Businessdictionary (2010b) defines it at two levels:

- “1. A systematic examination and evaluation of data or information, by breaking it into its component parts to uncover their interrelationships. Opposite of synthesis.*
- 2. An examination of data and facts to uncover and understand cause-effect relationships, thus providing basis for problem solving and decision-making.”*

The first definition emphasises data evaluation as the basis for analyses (which may be quantitative or qualitative, primary or secondary). The second definition emphasises the purpose of analysis as basis for impact (either cause-effect relationship or problem-solving impact). Specific analyses are a way to generate specific outcomes, because they call for specific data and apply specific procedures. Therefore, alternative analysis procedures can lead to different results. Amongst others, Grout (2007) identified a lack of standardisation in data gathering and evaluation, noting what he called ‘outcome-based detection’, which aims to identify mistakes based on the expected outcome or known error patterns. Zheng, Fader and Padmanabhan (2012) identified key measures of competitor’s customer activity, and a way on how to analyse these by showing a specific analysis application. They emphasised that relaxing assumptions leads to alternative, and more detailed models, which may reduce bias by controlling results from different viewpoints. Analyses can be understood as sub-processes interlinked with the main CI process. An analysis process explains interrelationships between data sets. The results serve to suggest a specific decision alternative. Specific software tools are designed to identify priorities, if various alternatives are suggested (Mindtools 2010).

3.3.3 Communication of Data Analysis Outcomes and Link to Decision-Making

This section discusses first decisions and support, second communication. Staskeviciute and Ciutiene (2008) identified process and product intelligence when stating:

*“The product of organizational intelligence is decision, characterized by qualitative features and effective and well – timed implementation of decisions. ... While implementing organizational intelligence, ... it is necessary to decide, which kind of organizational intelligence is needed – process or product. The organizational **product** intelligence is centred on the use of internal and external knowledge in a decision making process. The organizational **process** intelligence is oriented to the development of organizational processes according to the plan in order to create surplus.”*

When viewing the CI process as composed of process and product elements, as noted in Section 3.2, the CI process (process intelligence) may be seen as the basis of ongoing CI activity, whereas communicated CI analysis results lead to decisions (product intelligence). Anica-Popa and Cucui (2009) proposed a framework for decision support based on data mining, at the core of which are three tiers, namely *data*, *logic* and *decision*. The CI process works similarly by focussing on data gathering and analysis to suggest decisions. Panian (2009) stated that firms operate under changing conditions (customers, competitors, partners, market forces, regulatory forces) and proposed that real-time decisioning (RTD) helps to identify process steps and adds analytic insights. Panian (2009) identified six steps of the RTD process: performance goals, connection of systems and customer processes, monitoring processes, learning about customers and processes, evaluating impact on actions, and refining processes. RTD has some relevance for the CI process, as it focuses not just on task processes but also includes system characteristics, such as overall firm processes, the business context and linkages between analysis processes and decision-making. Panian (2009) argued that RTD was more dynamic than business intelligence, as it looks forward from planning and analysis to action, while business intelligence is concerned with analysis of past data.

Communication concerns knowledge exchange and creation (Businessdictionary 2015). De Backer and Gurven (2006) identified that individual learning in firms can be improved through effective communication. Specifically, they found that ad hoc communication and exchange of personal experience in teams can enhance learning. Sutanto, Tan, Battistini and Phang (2011) found that mediating is superior to directing in teams that are highly dynamic and manage complex tasks, which explains the importance of communication for CI teams. Tsitoura and Stephens (2012) expressed the importance of communication when identifying causes of CI failures, noting three areas of failures, data gathering and identification, analysis, and communication with senior management.

Capatina and Bleoju (2012) identified that knowledge transfer mechanisms are related to a firm's culture and leadership. They emphasised that organisational communication needs some structures to ensure successful knowledge transfer for strategic alignment. This PhD study argues that both standardised and ad hoc approaches (De Backer and Gurven 2006; Tsitoura and Stephens 2012) are necessary for communication. Urgent and unforeseen matters could possibly be communicated in a different way than regular issues (Almarshad 2013; Gilad 2004).

Many past studies have commented on the communication of data outputs – the dissemination of CI information (Fuld 2004; Gilad 2006; Leavitt, Prescott, Lemons and Hasanali 2004). Tsitoura and Stephens (2012) noted the importance of communicating intelligence results and making accurate use of results – with negative consequences from ignoring this. They identify a need to communicate results in understandable ways to management, not just to master reporting and dissemination.

Weick (1995) has written extensively on organisational sense-making; while Kouji, Shunichi and Akihiko (2010) noted in their research the importance of story telling as means of converting data from multiple sources into more effective knowledge sharing practices. Sense-making and story telling, among other, alternative elements can be regarded as key contributors to CI intelligence. Miller (2008) found that some areas of competitive understanding are often driven by *implicit* knowledge:

“The high level of allocative efficiency in experimental markets is driven largely by the ‘intelligence’ implicit in the rules of the market.”

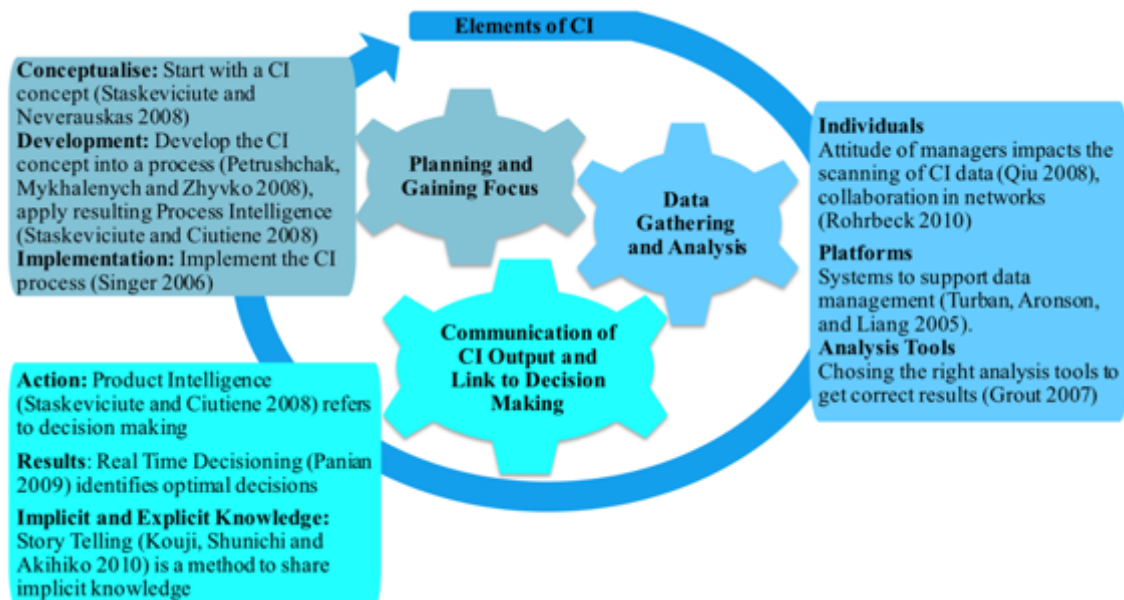
By investigating robots programmed to do (market) auctions, he argued that the rule ‘do no harm’ triggered no auction. Thus an implicit rule applies to ‘do harm’ when participating in an auction – this rule applies for competing firms when providing new services or products, or when a telecom competitor wins an auction for partnering with an MVNO (Mobile Virtual Network Operator), or (invited) frequency licence auctions.

Also linked to communication and decision-making, is the team management approach. The way teams and managers operate in relation to CI activities, shows both *explicit* and *implicit* characteristics. Woolley (2011) suggested a model for strategic team orientation, noting how effective strategic orientation is aware of the strengths of

opponents and how to react. The presence of strategic orientation is often based on implicit assumptions that can influence the attitude of CI analysts and managers towards internal or external knowledge practice, towards team communication (whether reporting or story-telling) and towards how CI evaluation links to decision-making and performance of the firm.

This section has identified commonly agreed CI tasks or activities from past research – the sequence of tasks, moving from planning and gaining focus on relevant CI issues to data gathering and analysis and finally to communication of CI analysis outputs that link to decision-making is one way of identifying the basic blocks that constitute a CI process across firms. A preliminary representation of these elements is shown in Figure 3.1 below.

Figure 3.1: Overview of Key Elements of CI Management



Schlick, S. (2015) this thesis, adapted from works of Prescott 2003; Blanchard 2001; Haberfellner, Nagel, Becker, Büchel and von Massow 2002; and Spickers 2004

The next section now takes further what is often regarded as core CI content – the actual forms of and scope of CI analysis.

3.4 Knowledge Management (KM), CI Quality and Effectiveness

Section 3.4.1 and 3.4.2 offer an overview of knowledge management and identify how KM is related to CI when examining internal firm processes (Ghanny and Mamlouk 2012; Mathi 2004) and considering the strength of knowledge sharing and knowledge dissemination. This links to CI quality, where the effectiveness of knowledge sharing in CI implementation needs to be considered. The effectiveness and sophistication of CI implementation is addressed in Section 3.4.3, where the ability to gather relevant knowledge at a strategic level in CI Management and CI Content is outlined.

3.4.1 Overview of Knowledge Management (KM) Thinking

Argote, McEvily and Reagans (2003) argued that knowledge creation is one of the most important outcomes of KM. Nonaka (1994) differentiated between tacit and explicit knowledge in the knowledge creation process with socialisation, externalisation, internalisation and combination elements for knowledge conversion. King (2009) broadened this view by defining KM as:

“the planning, organizing, motivating, and controlling of people, processes and systems in the organization to ensure that its knowledge-related assets are improved and effectively employed.”

Nonaka and von Krogh (2009) gave an overview about the scholarly debate about KM focussing on the concepts of tacit and explicit knowledge and knowledge conversion (as discussed in Nonaka 1994). They emphasised the core competitive advantage of knowledge, underlining the importance of the KM process that involves (King 2009):

“knowledge acquisition, creation, refinement, storage, transfer, sharing, and utilization.”

We can associate knowledge acquisition, creation, refinement, storage and utilisation with data gathering and analysis for CI, knowledge transfer and sharing with developing CI (transfer to learn), and communicating CI (share information), despite Paulin and Suneson (2012) calling these terms as ‘blurry’ and overlapping within scholarly literature.

In considering more specific links, Beamish and Lupton (2016) emphasised the importance of knowledge and technology transfer, as well as joint R&D in cooperative activities. This is relevant for the large-scale Swiss telecoms firms- due to their

organisational forms, where cooperation and knowledge sharing and dissemination between departments and with subsidiaries is essential. This indicates the importance of networks within firms (Garcia-Alsina, Cobarsí-Morales and Ortoll 2016), which are dependent on effective knowledge sharing processes.

3.4.2 Linking KM and CI Processes

Yang (2010) considered KM as a dynamic firm capability in improving firm performance specifically in creating competitive advantages (eg in product innovation). Zheng, Yang and McLean (2010) emphasised the role of KM in improving organisational effectiveness by linking organisational elements – culture, structure and strategy – with organisational effectiveness. Therefore, KM thinking can support the integration of CI in the firm context. Ghannay and Mamlouk (2012) explained that:

“KM and CI are ... strategies or practices through which organizations could use effective knowledge to improve organizational effectiveness, improve productivity, improve decision making, and especially, obtain a sustainable competitive advantage.”

Ghanny and Mamlouk (2012) considered the KM Process as one that focuses on the internal side of the firm while CI focusses on the firm’s competitive environment (Jaworski and Wee 1992). Ghanny and Mamlouk (2012) claimed that synergies of KM and CI can improve effectiveness. Mathi (2004) identified key success factors of KM as improving effectiveness internal processes. Davenport (1998) identified knowledge sharing within the organisational infrastructure as advantages of KM. Garcia-Alsina *et al.* (2016) saw the link between networks as an element for CI that is rooted in KM processes, noting in particular the knowledge embedded among employees in a flexible organisation. Ruizalba, Vallespin and Perez-Aranda (2015) argued that employee knowledge facilitates the generation of information, internal communication, and feedback and Palacios-Marques, Merigo and Soto-Acosta (2015) found that networks are a source of competitive advantage enhancing innovations.

Therefore, the KM process underpins knowledge sharing in CI processes, informs the organisational structures that support CI. Knowledge sharing and network-building can contribute to CI effectiveness- internal elements of the KM process can support externally oriented CI processes by helping to embed CI in the organisational context

(King 2009); and by valuing knowledge transfer (Nonaka 1994). Elements of KM underpin the integrated view of CI activity, shown in Figure 3.4 below.

3.4.3 CI Quality: Evaluation of Effectiveness and Sophistication

While past authors have considered the monitoring of CI implementation (Evans 2012; O'Brien 2011; McIntosh *et al.* 2011), neither the CI elements process overview (Choo and Bontis 2002); nor the module view of CI activity (as noted by Dishman and Calof 2008) nor the intelligence topics view (Herring 2006) have really examined how to assess the quality of the CI process. In addressing this issue, some previous studies have examined the quality of business analysis by focusing on requirements - from this, basic indicators of what might be important in CI effectiveness are considered below.

Quality is the degree to which a set of inherent characteristics fulfils standards (ISO 2008). This definition implies to compare results through assessment with requirements. IEEE (1990), the standard glossary for requirements engineering, defined requirements:

- (1) *“A condition or **capability** needed by a **user** to solve a problem or **achieve** an Objective.*
- (2) *A condition or **capability** that must be met or possessed by a **system** or system component to **satisfy** a contract, standard, specification, or other formally imposed documents.*
- (3) *A documented **representation** of a condition or capability as in (1) or (2).”*

BABOK (2009) noted some detailed requirements for business analysis:

*“In order to **plan the business analysis approach**, the business analyst must understand the **organizational process** needs and Objectives that apply to the initiative. ... In many cases, organizations will have **formal or informal standards** in place regarding how business analysis is done and how it fits into project and other activities. ... If no standards exist, the business analyst works with the appropriate stakeholders to determine how the work will be completed. ... The **business analyst must determine the process** that will be followed to plan the execution of businesses analysis activities.”*

Past research addressed elements that might be regarded as requirements of the CI process. Fleisher and Blenkhorn (2001) claimed that analysts are required to assess satisfaction of their internal customers, stating:

*“[Quality] requires the CI manager to assess the **satisfaction of customers** (e.g., decision-makers), CI practitioners, key external contacts, department heads, and other executives who both use and could potentially use CI outputs, etc.”*

Draghici (2011) and Tutunea and Rus (2012), in evaluating BI (Business Intelligence) solutions, both noted ‘information quality’ as critical. On the other hand, Kahaner (1996) identified different requirements for organising the CI process when stating:

*“CI requires appropriate **policies and procedures**, and a formal or informal **infrastructure** so that employees can contribute effectively to the CI system as well as gain benefits from the process. A **CI code of ethics** must also be incorporated in CI policies. The CI process depends on gathering people and resources from a range of internal units and encouraging employees to contribute to using and participating in the CI activities.”*

Kahaner (1996) identified requirements for people, resources, and structure for CI in a general way. The CI code of ethics (SCIP 2014) requires the ethic element for CI:

“Respect and recognition for CI; comply with laws; disclose relevant information; avoid conflict of interest; provide honest and realistic recommendations and conclusions; promote the CI code of ethics; adhere and abide the company policies, objectives and guidelines.”

Standards or requirements can represent the target state that is expected and evaluation represents how well the actual condition that has been reached. Having done both – identify requirements for a good CI process, and evaluate how CI process requirements have been met – allows firms to generate improvements in their CI process. Pivk, Vasilecas, Kalibatiene and Rupnik (2013) investigated how to optimise a multi agent system and found that assessing the process that underpinned the multiagency analysis helped to identify optimisation potential. Zheng *et al.* (2012) used aggregate customer data as competitive indicators and one of their observations is relevant, namely:

“When detailed predictions are the goal, the manager must obtain an adequate amount of customer-level data across firms.” And: *“[If] the focus is ...[on] firm-level predictions, ... then an abundant amount of customer-level data across firms is not necessary.”*

Zheng *et al.* (2012) concentrated on the optimisation of data identification (CI included) in order to address management queries (Fleisher and Blenkhorn 2001). In contrast, Molnar and Strelka (2012), in evaluating CI implementation, focused less on quality criteria of information, identified as important by Day and Schoemaker (2005) and more on people as critical factors. A summary of criteria for effectiveness of CI Activities from past studies are shown in Table 3.1 below.

Table 3.1: Criteria for Effectiveness of the CI Process

CI Activity	Criteria from past studies	Author
CI Management	Process: planning, analytical approaches are forward-looking	BABOK 2009; Krizan 1999; Evans 2012
	Structured and ad hoc approaches to CI: data gathering and analysis are relevant, correct, and current, use appropriate CI tools	McIntosh <i>et al.</i> 2011
	CI analyses and communication: use techniques as data visualisation, simulation, scenario development, and reporting	Kruschwitz and Shockley 2010
	CI Organisation: develop systems, fit CI team structure according to development stage of CI Process	Wagner <i>et al.</i> 2006; Britton <i>et al.</i> 1997; Yap and Rashid 2011
CI Quality	CI Effectiveness: apply a flexible strategy process, effective way to communicate results, systems perceived as effective, processes perceived as effective	Hutzschenreuter and Kleindienst 2006; Johnson and Lederer 2005
	CI Sophistication: emphasise on communication, systems and processes perceived as sophisticated	Rulke 2000
CI Content	Data gathering: interpret relevant market patterns / indicators, follow a structured approach	Rouibah and Ould-ali 2002; Herring 1999
	Data analysis: take different views on topics (focused or holistic), perform relevant analyses for predictive, comparative, and priority setting perspectives	Neugarten 2006; Yap and Rashid 2011
CI Synthesis	CI analysts' support of management decision making: effectively support decision making with relevant analyses	Peyrot <i>et al.</i> 2002; O'Brien 2011
	Management support of CI: management extents organisational resources to CI, CI deals with relevant strategic issues	McIntosh <i>et al.</i> 2011
	CI Process supports the relevant market scenario analysis	Maack 2001; Herring 1999

CI Quality is a core activity in the CI process and assessing the quality of CI output is usually subject to comparative analyses; assessing the CI process itself calls for a breakdown of effectiveness elements. Throughout the CI process, the fit of CI process design with the company and the strength of implementation are key criteria when evaluating CI quality. Monitoring a CI process can reveal deviations from requirements, applicable to each core CI activity. Kerr and Kren (1992) investigated how the monitoring of CEO performance were evaluated in firms and found that unique decision-making, such as outmanoeuvring competitors or reacting to a distinct event could strongly influence perceived performance. Effectiveness of CI may be assessed in terms of how far the needs of analysts and management are satisfied (McIntosh *et al.* 2011) by CI activities adopted.

Sophistication often refers to the ability of humans or firms to deal successfully with complicated tasks. Merriam-Webster (2016) suggested one definition of sophistication being: “*the process or result of becoming more complex, developed, or subtle*”. Other definitions refer to “*complexity*” (Dictionary 2016), or a (complicated) way to deal with complicated tasks (Cambridge Dictionary 2016). Criteria relating to the evaluation of process sophistication that have arisen in past research are shown in Table 3.2.

Table 3.2: Overview of Key Criteria for Sophistication – CI Management and CI Content

	Element	Criteria identified in past studies	Author
CI Management	Planning and Gaining focus	Process plan, forward-looking approaches	Krizan 1999; Evans 2012
	Data Gathering and Analysis	Relevant, and sophisticated analysis tools	O’Brien 2011 McIntosh <i>et al.</i> 2011
	Communication and Decision-Making	Appropriate communication techniques including reporting structures Evidence of linkages with decision-making	O’Brien 2011
	Systems, Organisation	Develop systems, adopt team structure according to development stage of CI process	Wagner <i>et al.</i> 2006
CI Content	Detect market indicators	Detect and interpret relevant market signals through appropriate levels of comparative /dynamic analyses	Rouibah and Ould-ali 2002
	Evaluate impact of market indicators	Generate a variety of views and data on key market and competitive developments (holistic), and make sense of data (e.g priority setting techniques)	Neugarten 2006

In examining Table 3.2, we can see that, in terms of CI Management, key indicators of sophistication centre on level of forward planning and appropriateness of analysis toolkits in use – it is anticipated that in more sophisticated CI, a range of analyses, business forecasts and scenario analysis to estimate present and future market developments might be adopted. Furthermore, taking a systems view, sophistication may occur in the nature of communication of CI outputs and in the degree of linkage between CI and decision making.

In considering sophistication in CI Content, Rouibah and Ould-ali (2002) pointed to the importance of interpreting weak signals for decision-making. Liu and Song (2007) claimed that analyses of indicators are critical- analysts should scan the whole market, with a focus on direct threats (e.g. main competitors, new products) and indirect threats (e.g. possible competitors from other sectors, disruptive innovations). Aspects of CI sophistication are also reflected in the systems elements that may drive CI within organisations.

In contrast to effectiveness, which may focus on the quality of implementation in CI activities, sophistication in CI processes in this study deals with level of complexity (as in different levels of CI activity e.g. operational and strategic roles) and with versatility in the choice and implementation of analytic tools for conducting CI analyses.

3.5 CI Content: Scope of Analysis

As pointed out from Fleisher and Bensoussan (2003; 2007) CI analysis is a core part of the CI process. The CI process – as any other process – has a material part, consisting of input data, data transformation, and analysis output (see Businessdictionary 2010a). CI data collection involves data identification; the data that is sought often relates to changes in the market and competitor moves; such data should be reliable and offer some opportunity for analysis (Prescott 2003). Rajaniemi (2004) identified the importance of scanning, noting the need to combine human and information systems. Williams and Mitchell (2004) investigated the U.S. telecom sector, finding that a focus on market scanning can indicate a willingness of the firm to enter that market. They emphasised that personal knowledge of or direct links to a market enhance or lessen the

likelihood of a firm to enter it. Xu and Kaye (2009) identified early warning indicators, which they found to be important for competitive advantage, especially as emerging technologies are poorly tracked (Day and Schoemaker 2000). Gilad (2004) defined strategic early warning as:

“[to] *identify strategic risks and opportunities before they are obvious to everyone.*”

Fuld (2004) claimed that:

“*Management reacts slowly or inconsistently when a threat arises even after management has identified an early warning shock*”.

Gilad (2006) supported Fuld’s view by suggesting that new products and/or services from competitors and new technologies have been found to be major risks in firms that are often insufficiently considered (Gilad 2004). Thus data input in any CI process depends on the identification of data priorities and on the scanning process that is undertaken.

3.5.1 Static, Dynamic and Predictive levels of Analysis in CI Content

Static models aim to observe and analyse competitors’ actual competitive behaviour in the context of the actual market. A decade ago, Porter (1998) wrote that every country, company and person must master competition, and understand its competitor, to thrive in brutal international and domestic economies. Wolters (2011) used Porter’s five forces framework (Porter 1998) to identify the competitor state – through the identification of entrants and potential substitute products, the evaluation of existing competitors and the relative strength of key actors such as suppliers and customers (at different ends of the value chain). However, the rationale behind an analysis such as Porter’s five forces has less credence in very turbulent markets. The five forces framework Porter (1980) is criticised by Recklies (2001) as a framework that views the market in a static way, that is too simple in terms of identification of key actors and leads to less optimum conclusions due to being less able to address rapid technological change. Grant, Butler, Hung and Orr (2011) argued that focussing on industry-level analysis can only partly explain business performance. Goold (1997) felt the need to adapt the framework, replacing Porter’s competitive advantage assumption by an institutional advantage assumption for non-profit organisations.

More fundamental limitations in the framework have also been advocated – Aktouf (2008) identified that Porter’s framework neglects soft factors such as culture, people,

learning, leadership, and communication, noting that such factors are crucial for competitive advantage. Porter's framework was additionally criticised in terms of predictive limitations. The model does not explain how to determine, if a threat is high or low, as noted by Grundy (2006). He noted the need to consider interdependencies, to bring in combinations with other models, to examine sub-forces, dynamics and mind-set of industry.

Even though the limitations of the five forces framework have been acknowledged, there is also acknowledgement of its value as a useful starting point in defining the nature of the competitive environment in a sector (Denning 2012). Some scholars have adapted the five forces framework further, through the identification of additional forces to fit the framework to a specific sector. Dulčić, Gnjidić and Alfirević (2012) added collaboration and time dynamics to overcome the static problems of the model.

Karagiannopoulos, Georgopoulos and Nikolopoulos (2005) identified 'intensity of Innovation' as an additional force in the five forces framework. They argued that failing to address this force could have devastating consequences (non-competitiveness, destruction of a firm or an entire sector). Aktouf (2008) further identified collaboration and alliances as a sixth force (complementary). Flower (2004) identified three additional forces: digitisation, globalisation, and deregulation for global computer networks. Andriotis (2004) identified two additional forces for the travel and tourism industry, namely: information technologies and government regulations, and added an additional element to the buyers' perspective, namely the power of intermediaries.

In considering the telecom sector, Ghezzi (2011) used the five forces framework and found it to be useful for the mobile telecom industry, outlining how the framework can be applied for the external analysis of the market for assessing market return issues and market attractiveness (integrating both ideas into his framework). In considering CI analysis, Jaworski and Wee (1992) in their CI literature review, and found a relationship between CI external analysis that focused on market driving forces and actual business performance. In this research study, some external forces analysis is applied in this research to investigate the telecom market at the level of market context (see Chapter 6). This accords with Grundy (2006) and Dulčić *et al.* (2012) by combining the external analysis with other analysis (notably more predictive analysis) to provide a full picture

of CI Content. This PhD study follows Aktouf (2008) by adapting the framework and balancing it by including soft factors, such as evidence of learning in forms to enable CI development, and communication of CI analyses for management decisions.

A more dynamic perspective in CI Content and in forms of analysis aims to anticipate competitors' actions. Chen (1996), in looking at variables for competitor analysis, focused on inter firm rivalry and took variables such as *size of enterprises*, and *likelihood of attack and damage* into account. Gnyawali and Madhavan (2001) claimed that network structures influence competitive behaviour, by showing how networks influence reactions in the field of competitive dynamics in terms of likelihood to attack. Hwang and Christensen (2008) analysed disruptive innovations that occur when firms act aggressively (e.g. undercut prices by offering low-end products), developing a more dynamic analysis of external competitive events.

Statistic, probabilistic, and game theoretic methods provide dynamic market analysis that focus on predictive forecasts; notably, the work of Pfaff (2010), who explained how to compute forecasts using the software R; the ordinal preference model applying game theory, developed by Fraser (1994); and the work of Reger and Mahoney (1993), who showed the relevance of game theoretic approaches for analysing competitive dynamics of the market. Michaeli and Simon (2008) applied a probabilistic approach as Bayes' theorem to compute conditional uncertainties. Another application comes from Liu and Wang (2008) who developed a model (service taxonomy and mathematical process) to forecast a competitor and own firm business strategy. Quantitative models can serve for a shorter time frame forecasting – i.e. a few competitive events; a few years, whereas qualitative models can explore possible futures for a longer time horizon.

3.5.1.1 Predictive Analyses – Scenario Analysis

Scenario analyses apply a mix of qualitative and quantitative data. Wilburn and Wilburn (2011) defined scenarios as descriptions of possible future markets (five to twenty years). Noting that scenario analyses are resource intensive, they suggested an approach based on published scenarios (government and industry), which this PhD study applies as well. Rounsevell and Metzger (2010) discussed scenario techniques emphasising the

logic and storyline for environmental scenario analysis. De Man, Lugtigheid, Sardjoe, Budde and van Hemmen (2009) identified scenarios based on indicators as identified by experts. Their scenarios aimed to project trends into the future. Due to the uncertainty of forecast, optimistic and pessimistic scenarios can be included (Fleisher and Bensoussan 2003). van der Merwe (2008) provided a framework for scenario analysis pointing out three issues, namely systems thinking being crucial for the scenario planning process, problems with predictions, and the need for continuous learning for strategy. Fink, Siebe and Kuhle (2004), and Tessun (1997) claimed that firms should aim to have multiple views about their ‘window of opportunity’ and scenarios help to bridge the gap between the implementation of strategy and indications of market changes. Mullekom and Vennix (2004) Mullekom and Vennix (2004) identified indicators as the last step in the scenario-building process and claimed indicators should be comprehensive in scope:

“Activities of driving forces; trends with high impact and low uncertainty; internal or external performance of firm; dependencies of planned actions with requirements.”

The possibility of identifying relevant market indicators which underpins scenario analysis is of significance to CI analysis at both market and at firm level. Xia and Wang (2009) emphasised technology crisis forewarning as an important in the CI analysis cycle. McGahan (2004) emphasised the need to differentiate the nature of competitive threats, when stating:

“Industries evolve as a result of two types of threats: A threat to the industry’s core activities, and to the industry’s core assets.”

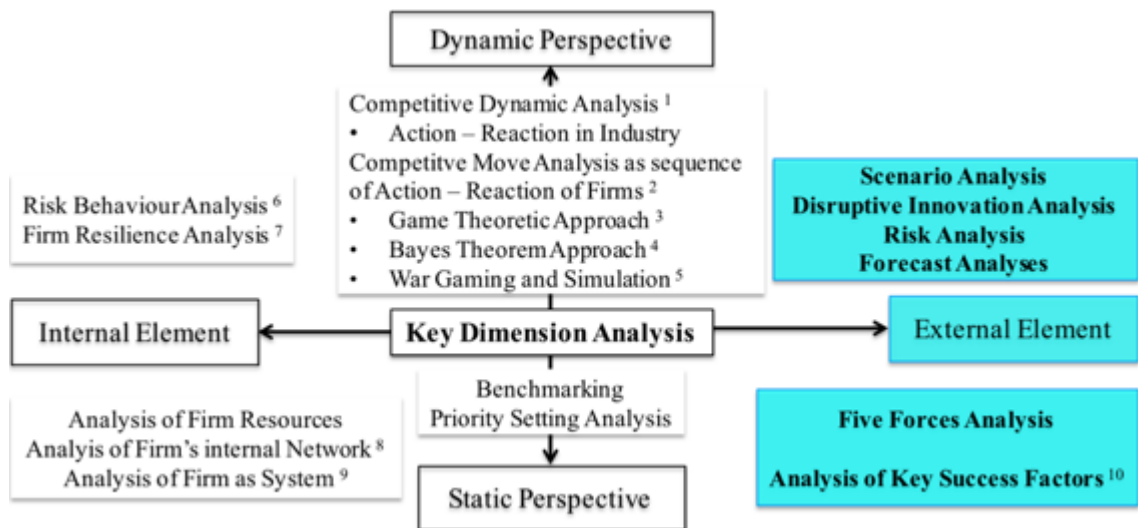
The combination of both threats, according to McGahan (2004), results in four possible scenarios of industry change: *radical*, *progressive*, *creative*, or *intermediating*. It is *radical* when core assets (new technologies) and core activities (new channels, destabilised key relationships) are both threatened. It is *progressive* when neither core assets nor core activities are threatened. Firms adapt to feedback and develop a system of interrelated activities. It is *creative* when core assets are threatened (new products) and core activities (key relationships) are stable. It is *intermediating* when core activities are threatened and core assets are stable resulting in destabilised key relationships due to emerging channels. The analysis of market threats, as outlined by McGahan (2004), enables some identification of competitive priorities for firms. Robinson (2015) discussed the importance of cooperation, an important element to consider when analysing threats and considering reaction, because retaliation could

harm collaborative networks (for example supply chains). Erickson and Rothberg (2015) found only a weak link between CI and profit, but dismissed this weakness for specific circumstances (high growth sectors). In the case of sectors under extensive changes as the telecoms, there is clear need for on-going analysis activity to align to the on-going market changes (BAKOM 2011).

In extending the work of Mullekom and Vennix (2004) the factor of uncertainty is considered as threatening for decision-making and was regarded as important in the Dutch telecom sector (De Man *et al.* 2009). Wilburn and Wilburn (2011) noted that scenario analyses are resource intensive, suggesting an approach based on published scenarios (government and industry), which this PhD study applies as well. An application to predict competitor behaviour using scenario analysis is undertaken in Chapter 6, following the approach used by De Man *et al.* (2009). In this PhD study scenario analysis was linked with indicators to identify the most likely scenarios for the Swiss telecom market and to consecutively provide forecasts by analysing the identified indicator variables. Considering the need for adaptability of firms to market changes, Schoenherr and Swink (2015) emphasised the importance of supply chain and innovation on new product launches – as one possible market reaction.

We have discussed in Section 3.5.1 the key elements of data identification and data gathering and the range of analysis from internal to external perspectives. This study, in highlighting the static to dynamic analyses possible, has identified a range of analytic methodologies. In considering the range of static and dynamic analyses that may be possible in CI analysis, past studies have, in effect used combined CI analysis frameworks. Sammon, Kurland and Spitalnic (1984), and Kahaner (1996) suggested a range of static and dynamic frameworks to analyse competitors, notably, critical success factor analysis, competitor profile analysis, and value added analysis. Day and Schoemaker (2005) investigated environmental scanning among firms, noting poor scanning methods in use and recommending the need for peripheral vision with a mix of static and dynamic elements. Based on the above discussions, Figure 3.2 maps the analysis methodologies that CI can encompass – ranging from internal to external focus and from static to dynamic perspectives.

Figure 3.2: Overview of CI Analysis Methodologies that underpin CI Activities



¹ A series of actions and reactions in an industry create competitive dynamics (Barney and Hesterly 2015; Smith, Ferrier and Ndofor 2001).

² Competitive move analysis (Chen 1996; Schimmer 2011) is seen as a strategy of two firms creating action – reaction sequence patterns. Recently, the raise of tension between two firms of similar in resource profiles and shared interest in the market is questioned (Schimmer 2011).

³ Game theoretic approach (Reger and Mahoney 1993) to formally model strategic interaction, and competition related questions (Schimmer 2011)

⁴ Bayes Theorem approach applied to identify the risk of a specific action of a competitor (Michaeli and Simon 2008).

⁵ War gaming deals with the simulation of moves and countermoves in a firm internal environment (Chussil 2002).

⁶ Risk behaviour analysis to identify and potentially reduce risks (see Section 3.8.1.1)

⁷ Firm resilience analysis by emphasising the people under resilience (see Section 3.8.1.1)

⁸ Network analysis (Gnyawali and Madhavan 2001) of cooperative relationships that influence the flow of resources among them. This study inspects internal networks of cooperation with the purpose of information exchange.

⁹ Analysis of the firm as a system (Blanchard 2001; Brewster 2011)

¹⁰ Analysis of key success factors deals with with skills and resources that are required to be successful in the market (Grunert and Ellegaard 1992)

Wright and Calof (2006) investigated CI active firms identifying static, dynamic, internal, and external elements but they did not identify the nature of the analytic frameworks in detail – the diagram below offers a more integrative view of the range and scope of analysis involved in CI. Jaworski and Wee (1992) described ties between CI and performance, stating that effective CI practice improves the quality of firms' strategic plans by mixing internal and external perspectives, but did not differentiate which analytical frameworks represented such perspectives. The overview in Figure 3.2 takes this further, showing a mix of analytic frameworks that are adopted for CI

analyses – the frameworks differ on the basis of a static or dynamic time perspective, and on the degree to which they are internally or externally focused.

3.5.2 Comparative and Priority Setting Analyses

CI comparative analyses aim to analyse and compare activities in order to identify options for strategies. Benchmarks, best practice, and qualitative comparative analysis are typically used in CI. Typical benchmarking compares aspects of the own firm with market leaders (Boxwell 1994; Wagner, Scott and Galliers 2006). Benchmark analyses support firms in gaining competitive insights (Boxwell 1994; Wagner *et al.* 2006).

Jetmarova (2011) defined benchmarking as:

“A continuous process of measuring systems, processes and products within the company and comparing them with competitors or other companies that are successful in the same field. It is very important for all companies to constantly monitor their competitors, because it is one of the basic conditions of increasing their efficiency and market share. The aim of such comparing is to adopt the new practices and procedures and in particular to obtain information which leads to improve business performance.”

Jetmarova (2011) suggested that four key questions answered, namely:

“Planning: what to benchmark? Data collection: who is the best? Analysis: how they do it? Adaption: how we are going to do it?”

Jetmarova (2011) claimed that innovations are costly and risky due to market pressures and technological changes and suggested benchmarking as a way to analyse such market and competitive pressures. However, Knechel, Salterio and Kochetova-Kozloski (2010) found that benchmarks might cause firms to focus only on short term performance measures. Often, because CI is an emergent business function, there is less focus on tangible benchmarks and more focus on what is regarded as best practice. Wright, Pickton and Callow (2002) provided a framework for CI best practice for attitude type, gathering type, user type, and location type. Wright, Eid and Fleisher (2009) applied this approach to major UK retail banks suggesting a strategic attitude existed in CI intelligence actions, noting the attitudes as that of a hunter gatherer; a strategic user, and a designated locator. What these studies have identified is the importance of the internal management approach to CI, thus echoing the focus on soft CI issues, noted as important by Grundy (2004). Leavitt *et al.* (2004) suggested best practices in CI to improve business performance, proposing that firms should start with CI team development and elaborate through the building of CI awareness, culture, and early recognition CI issues.

When we consider the link between CI outputs and decision-making, both firm approach to decision-making and the nature of decision-making can vary across firms. Dane and Pratt (2007) identified different approaches to decision making: of these approaches, we can identify an insight and a rational form. *Insight* applies learned knowledge and relies on knowledge sharing, and feedback. *Rational* applies computable and replicable knowledge in a logical order. At early stages of CI development in firms, there may be less focus on rational benchmarking, and a greater use of less formal forms of comparative competitive analysis- such analyses may rely on analyst insight.

Where comparative analyses rely on insight as a basis for decision choices; priority setting analyses typically provide a structured set of alternatives, and therefore a rational basis for decision choices. In firms with more developed CI processes, which may integrate more with strategic decision-making within firms, analysis is likely to include priority setting analyses, which theoretically should prepare the way for decision-making by suggesting prioritised alternatives, based on the CI outputs (Drucker, Hammond and Keeney 2001; DeVault 2011). Tasks that might be involved in this more developed level of analysis would include a logical sequence of evaluative analyses; *first*, an analysis of threatening issues, which can be static, predictive or comparative; *second*, identification of alternatives by analysing indications for change; and *third*, assessment of alternatives and decision considering the firm as a whole (a systems view). This would suggest a systematic approach.

The benchmarking process in the CI cycle at firm level deals largely with comparison of competitive actions, competitive position; forms of analysis that often involve current monitoring of competitive activity- relatively standard processes. In the telecom sector however, where there is significant and rapid technological change and such change is difficult to assess in terms of future impact, competitor profiling will aim to predict future strategic moves of one or several competitors (Fleisher and Bensoussan 2003). An *intuitive* approach by analysts (a third form of decision-making identified by Dane and Pratt, 2007) may be applicable as it is context where calculable information may be sparse- thus the basis of firm decision-making that arises from CI outputs may vary according to the level of information that is assessable.

Contextual conditions will also have a bearing on the nature of decision-making that may be evident as a result of the CI input and output cycle at firm level. Spetzler, Hewitt, Judd and Fishman (2004) differentiated between *rigorous*, *conscious*, and *casual* decision-making with *rigorous* as difficult, *conscious* as easy to make, and *casual* as repetitive decisions. Information systems permit the analysis and structuring of large scale data, thus facilitating priority setting analyses at firm level. Techniques to support setting priorities, such as grid analysis, cost benefit or utility analyses allow alternatives to be noted; indicators can then be listed, priorities or weights can subsequently be given to the alternatives for each indicator and from this, an optimal alternative is identified by adding the weights of the indicators for each alternative. A typical software tool for setting priorities is for example 1000 Minds (2011). Salmeron and Herrero (2005) measured the success of the implementation of executive information systems by ranking performance using critical success factors, based on a hierarchy model with categories such as *human resources*, *information and technology*, and *system interaction*. One key finding from their study was the importance of matching data analysis with the right information needs at the outset.

In summary, past research suggests that CI data analysis methodologies are potentially quite varied. Data analyses can be structured into static or comparative analyses of past and present competitive or market events, or may take the form of more dynamic predictive analyses, which aim to forecast future events. In a market such as the Swiss telecom market, the focus of CI is on analyses concerned with rapid technological and market changes, strategic competitive moves and product innovations (Gilad 2006), thus possible forms of analysis can vary – we have noted above the variation in adoption of CI analysis methodologies from best practice frameworks (comparative) to scenario analysis (predictive) that should theoretically, enable firms to deal with market changes. Predictive analyses are a basis for setting priorities that arise through the CI output, as they offer alternative reactions to market changes and permit decision-makers to assess alternatives to suggest optimal decision options. However, such analyses and such CI outputs depend on several factors – noted here were factors such as the identification of clear information needs, the availability of data, the nature of decision-

making within the firm (e.g. whether depending on CI analyst or managerial insight or on rational decision alternatives that can be generated with information system support).

3.6 Systems Thinking and an Integrative CI Framework

So far, we have examined past research that has illuminated the nature of CI – the CI process has been conceptualised (Staskeviciute and Neverauskas 2008) in the section on CI Management above, the core elements of the CI process were identified (planning and gaining focus; data gathering and analysis and communication of outputs and decision-making). We have also examined the constituent actions of a typical CI process. Three core activities can be regarded as central to CI – in Section 3.3, CI Management (involving key elements, such as planning and gaining focus, data gathering and analysis and communication of CI outputs and link to decision-making) have been outlined. In Section 3.4, by examining CI Quality in past studies, an evaluation based on operational effectiveness within the CI process and an evaluation that examined the sophistication of CI design and potential integration with other firm activities has emerged. In Section 3.5, past thinking on CI Content and the range of CI Analysis that is possible (ranging from static to dynamic; internal to external) has been clearly set out.

However, when examining CI, in Section 3.2 above, we identified a challenge when defining the nature and scope of CI activities. Part of this challenge arises from a tendency in many prior studies to see CI as a functional process and perhaps not to consider sufficiently the other processes that a) it depends on and b) that the CI process networks with. How the CI process is designed at firm level (Petrushchak *et al.* 2008; Tutunea and Rus 2012), and how it is implemented (Molnar and Strelka 2012; Brewster 2011; Singer 2006) can vary across firms. In this regard, Brewster (2011) considers how a systems perspective improves process design for client management:

*“Participants taking a holistic systems-based view of a client environment develop **more coherently organized** mental models that increase their likelihood of identifying management representations that are inconsistent with industry evidence. Furthermore, these participants more efficiently use their information-processing ability, thereby improving assimilation of newly learned evidence to understand how changing business conditions affect their initial expectations. ... This systems view involves developing, and*

organizing a mental model of the client environment by holistically evaluating causal relationships and how they change over time.”

Brewster showed how a systems perspective can improve client management. If we examine his ideas, we can see that a significant part of this argument notes the importance of information-processing ability and ‘improved assimilation of newly learned evidence to understand changing business conditions’. This ability and this assimilation is central to CI – therefore – systems thinking is relevant to CI process design because the underlying conceptual framework includes the firm as a whole. McGonagle and Misner-Elias (2016) claimed that the CI cycle being inexistent because so called ‘do-it-yourselfers’ conduct CI (the analysts in firms). Their main critic was the lack of feedback in the CI cycle model. Two aspects are important when considering the CI concept from the systems perspective: the organisational context of the CI process, and a focus on how the CI process links to other elements of the management system and to strategic decision-making. Each of the elements of CI Management links to other key functions across a firm. Focus and planning is linked to management queries and strategic planning at firm level, data gathering and analysis is linked potentially to collection and analysis linked to IT, communication of CI outputs is linked with both input (e.g. R and D) and output processes (i.e. customer management systems and front line customer services) that parallel CI activities. How CI outputs feed into decision-making is again linked to the strategic decision-making structures within the firm. Thus, there is, in practice, an interrelatedness of CI activities with strategic management thinking. The internal systems that enable the linkage between CI and other organisational functions (Blanchard 2001; Spickers 2004) are an important aspect to consider when looking at a more integrated view of CI processes in firms.

Systems thinking can therefore enable us to understand the implementation of CI processes better and this is evident in two systems-oriented conceptual frameworks – that of systems engineering and of the St. Gallen management model. SE (Systems Engineering) was designed to improve project planning and create or improve systems (Züst 1999). It focusses on the realisation of specific systems (Britton, Jones, Myers and Sharif 1997), as Blanchard (2001) explained:

“[SE is] an interdisciplinary approach and means to enable the realization of successful systems.”

SE consists of two concepts: the ‘life cycle model’ for planning, realising and disposing a system, and the ‘problem solving cycle’ for situation analysis, formulation of aims, synthesis and analysis of the concept, and evaluation and decision (Haberfellner *et al.* 2002). The concepts of SE can be applied to realise a specific the CI process, as it covers all elements of CI Management set out above in Section 3.3. SE may not directly combine CI with the organisational structure of the firm, organisation, but the internal systems can establish an enabling relationship, as Blanchard (2001) explains:

*“[A system is] a construct or collection of different elements that together produce results **not obtainable by the elements alone**. The elements, or parts, can include people, hardware, software, facilities, policies, and documents [...]. The value added by the **system as a whole**, beyond that contributed independently by the parts, is primarily created by the **relationship** among the parts.”*

Within the systems view the interplay of the components has prominence (Senge 2006). Bartes (2010) identified CI as one application discipline of systems theory, which takes effect, as it places CI within the overall organisational context.

The management model of St. Gallen also views the firm as system. It gives an internal perspective for management through three dimensions (normative, strategic and operational). The aim of the strategic dimension is to have an advantage over the competitors (Bleicher 1999); the operational dimension is about efficiency in implementing strategic goals and the normative dimension is concerned with general aims, principles norms and identifying the management team. In the expanded view of the St. Gallen model, three integrative levels exist: strategy, structure, and culture (Spickers 2004): each of these areas suggests a way of thinking and interacting, which spans throughout the organisation (Spickers 2004). The interactive capacity of the system seeks to generate both horizontal and vertical integration of the three dimensions (strategic, normative and operational) and to reflect internal and external factors that link to corporate development (Bleicher 1999; Schwaninger 2001). Both SE and the St. Gallen model are useful when considering how CI process design may be optimised – they propose that CI can benefit from systems thinking. In contrast to the integrative view of CI as part of an overarching interactive system that the St Gallen model proposes, SE offers a concept for the life cycle of complex projects or information systems with a more operational direction.

Both the nature of CI elements view (Choo and Bontis 2002) and the CI modular view (Dishman and Calof 2008) identified key CI tasks, thus suggesting a process structure but neither conceptualisation elaborated adequately on how to link the process steps. SE offers a way to link the process steps because the system view takes operationally relevant perspectives into account (time dimension, internal and external factors) offering linkages between process steps at an operational level. The St. Gallen model offers a holistic view on structuring firm support for CI as part of the internal system. Therefore, it appears fruitful to include a systems perspective when conceptualising CI.

Figure 3.3: Integrating Systems View and CI Management Elements

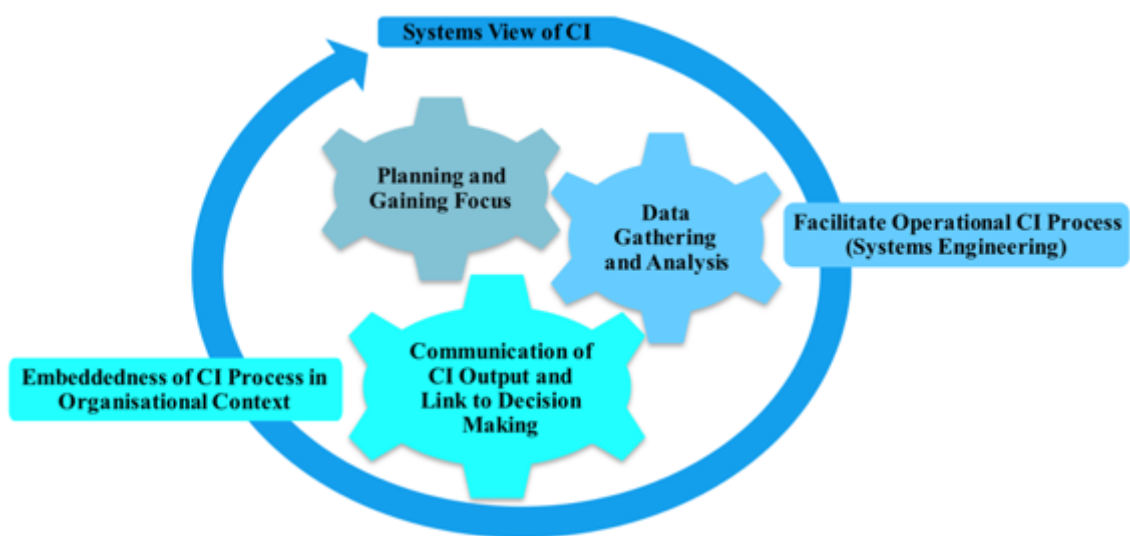


Figure 3.3 depicts the three key CI Management elements (planning and gaining focus, data gathering and analysis, communication of CI outputs and link to decision-making) at the centre. Dishman and Calof (2008) claimed that organisational awareness and culture contribute to the CI process, yet any view of CI that only considers the central Management elements needs also to consider how far the firm context shapes the CI process. These elements in the centre are therefore surrounded by systems thinking, illustrated on the left by embedding CI into the wider firm context and on the right by facilitating operational aspects of the CI process and the fit with the overall business systems.

We have noted above that it has been challenging to conceptualise CI adequately and have noted the need to bring in systems thinking into our representation of the CI

process. In addressing this challenge to bring in a more holistic view of CI the next two sections in this literature review address in Section 3.7 the importance of the organisational structure and the support for CI and in Section 3.8 the degree to which CI processes can be networked and are synthesised into the overall business system.

3.7 Organisational Structure and Support for CI

Considering core CI activities in terms of the firm organisation that supports it requires theorists to see the shape and nature of the CI process as an outcome of the overall organisational structure and support that is developed for it. The new management model of St. Gallen integrates strategy, structure and culture (Spickers 2004) both horizontally and vertically (Bleicher 1999; Schwaninger 2001). The organisational support for the CI process is part of the firm organisation and influences the degree to which external information (market, competitors) can be successfully accessed and analysed.

Staskeviciute and Neverauskas (2008) offered a useful overview of organisational intelligence, taking the example of a university they outline how organisational transformation occurs by thinking systemically rather than hierarchically. They put group work and group decisions in the foreground instead of hierarchies and individuals. When considering how this relates to the CI process, it is their emphasis on informal – ad hoc and flexible – ways of interaction that has relevance. Explicit and implicit knowledge sharing are an important organisational support for effective CI. In considering Miller (2008), who argued that implicit knowledge drives allocative efficiency, and Nonaka and von Krogh (2009), who emphasised that tacit knowledge is of central importance in knowledge creation, it is important to take into account the nature of knowledge sharing practices that are part of the CI activities in firms. Bray (2007) identified a key steps for knowledge sharing in turbulent environments: opportunities and motivation to exchange knowledge; the process of knowledge exchange, and its impact on organisational performance. These steps apply for CI activities in the firms, too. It is noteworthy that Bray (2007) and Calof and Dishman (2008) emphasised the impact of knowledge sharing on organisational performance, which is seen as relevant for this PhD study. Razmi and Ghasemi (2015) found

relatedness between flexibility – which they agility – and technology intelligence, trust, and commitment, implying the importance of links (systems). These considerations show the importance of knowledge management for CI activities. Schweinsfurth and Herstatt (2016) detailed the innovation process emphasising to include CI and the role of employees within that process by defining the need for knowledge.

In considering explicit knowledge gathering and knowledge sharing this brings the role of information systems in CI implementation into play. While the identification of the organisational structure that supports CI is a good starting point for defining CI less as a discrete function and more as an integral part of the overall management approach, a further consideration is the technology that underpins CI activities. When examining the Swiss telecom market, one critical area of CI is technological intelligence. Technology intelligence enables a firm to identify and analyse technology changes (Hwang and Christensen 2008). Information systems support the application of data analyses of market changes, which is a core CI activity. Information systems support technology intelligence, as noted below in the following definition:

“A multi-disciplinary subject, whose objects of study are information and its functions, information technology and its use in organisational contexts” (Kecheng 2000).

Arman and Foden (2010) presented a technology intelligence process and toolset supporting firms to assess technological changes. At the core of the process is a scenario analysis for technology threats and opportunities, and a benchmark of the firm’s position. Tanev and Balletti (2008) recommend applying appropriate firm classifications and in depth statistical analyses when studying the relationship between CI information and innovation. Capon, Farley and Hulbert (1988) identified criteria to evaluate organisational innovativeness as one factor of change, stating:

“Evaluate how often a company is the first-to-market with new products and services compared to the competition; evaluate the market stage (growth, maturity, decline) at the moment of introduction of a new product or service; evaluate the novelty of implemented technologies.”

Evaluating innovativeness can identify the nature of market change but can also evaluate how well the organisation is set up to assess technological change, to identify the impact and to generate alternative options to respond to technological change. Stair and Reynolds (2011) illustrate the success of executive information systems, such as how they can help to determine critical drugs in a hospital, to spot safety issues, and

to generate information for staffing decisions. Swan (2001) claimed that the ability to organise knowledge with an appropriate knowledge management system enables firms to encourage innovation. Expert systems have been seen as exemplars of this kind of integrated information system approach. Turban *et al.* (2005) defined a computer based decision support system as: “*combining models and data in an attempt to solve non structured problems with extensive user involvement*”.

While information systems should be usable in organisational contexts (Kecheng 2000) and should be well-adapted to user needs (McIntosh *et al.* 2011), their robustness in supporting CI depends on the resources management of the firm. In practice, it needs to be asked how information systems are actually applied in CI activities at firm level. In this study, in addition to gaining insight into ‘what information systems are used?’ the researcher also seeks to understand the CI process design (how CI is structured at organisational level?) and the team organisation (how is the analyst role manifest?)

Business Intelligence (BI) places emphasis on a highly systematic use of information systems (Dittmar and Gluchowski 2002) to capture and disseminate data. However, Draghici (2011) suggests that BI is primarily concerned with data, while CI is primarily focused on analyses. Hannig (2002) identified BI as effective, if its functionalities are adapted to the individual needs of the firms. Sangari and Razmi (2015) found that BI supports flexibility in supply chain performance by comprising technical, cultural and managerial competencies in firms. BI provides broader ongoing information systems that can support the CI process but also support other management functions. Key information systems functions that have been identified (Wright 2005; Schlick 2006; Schlick 2009; Schlick and Wright 2011) include knowledge management systems to store and structure internal information, competitor information systems to support identification of external threats and opportunities (Fletcher and Donaghy 1993), mathematical modelling systems to support data analyses and forecasting, and management information system or executive information system to analyse top level financial data, and customer relationship management systems to crunch customer data.

This PhD study takes the view that core CI activities are carried out by analysts as actors who process data, who analyse CI content and apply systematic analysis if appropriate to the information needs. The CI process may, in addition, draw upon all of the identified systems of information available within firms. Table 3.3 sets out some of the supporting system tasks that might be relevant when examining core CI activities.

Table 3.3: Overview of CI Management Elements and supporting System Tasks

Key Elements of CI Management	Tools	Information System	System View
Focus and planning	Systems Engineering	Competitor Information System KM System	Align CI process with other firm processes
Data Gathering	Internet, Databases, news, rumours	Competitor Information System, Knowledge Management System	Knowledge sharing from firm databases
Data Analysis	Business analyses, statistical analyses, customer relationship analyses	Market analyses (predict, compare), Management Information System	Learning CI team for doing analyses
Communication	Communication tools such as internal reporting, intranet, email, face to face or social media platforms	Management Information System, intranet portals, social media applications	Knowledge transfer within organisation
Decision	Firm as system, Management Model of St. Gallen	Market analyses (set priorities, alternatives, recommendations)	Embed CI process in firm organisation

Nevertheless, CI activity is also human-oriented and is equally about human insight, intuition and innovative thinking on the part of the analyst. McIntosh *et al.* (2011) emphasised the importance of the team structure and roles for CI. Rapp, Agnihotri, Baker and Adzulis (2015) identified that role conflict impacts the collection and use of CI, showing the importance of analyst roles. While Choi, Han and Cheng (2015) emphasised the importance of systems in supporting analysts by managing large volumes of data, the CI team organisation aspect is also significant. Hattula, Schmitz, Schmidt and Reinecke (2015) emphasised that firms should balance their organisational culture insofar as to pay importance to all departments.

3.8 CI Synthesis of Process and Decision-Making

When considering CI synthesis, two aspects are considered – the link to decision-making and the degree to which the CI process is integrated into strategic management thinking at firm level.

3.8.1 CI Synthesis and Decision-Making

This section looks first at decision-making in general, then at the link between decision-making, risk and resilience and then addresses how CI Content (analyses) supports decision-making. Decision-making results in action and based on firm internal and external conditions. Mulcaster (2009) suggested three frameworks applicable for strategic decision-making. The first compared ‘opposing forces’, the second aimed to manage these forces, the third aimed to identify competitive advantages taking a mainly comparative view of the market. Papadakis *et al.* (1998) focused on decision-making and potential influencing elements. By analysing an integrative framework with elements as for example decision-specific characteristics (impact, threat, uncertainty, planned versus ad hoc), and management characteristics (top management aggressiveness and education), they found that decision-specific characteristics best explain decision making. This PhD study takes a similar approach to earlier studies by focussing on how combined elements feed into decision-making.

Ketchen, Snow and Street (2004) investigated important questions of decision-making:

- 1) “*Whether to enter a new market?*” advantages and risks of pioneering in the context of existing regional clusters of firms.
- 2) “*How to respond to a competitive attack?*” the difficulty and importance of managerial decisions to react on competitive attacks and reaction time.
- 3) “*If and how to pursue growth in existing markets?*” customers’ perception, and to consider if each rival firm in a market will retaliate.
- 4) “*Whether to compete or cooperate?*” cooperate for activities far from the customer (for example development, recycling) and to compete close to it (for example distribution, product development, and marketing).

However, Ketchen *et al.* (2004) did not address situations that might occur simultaneously, for example, a firm makes a decision whether to enter a new market while at the same time, it has to consider how to react to a likely ‘competitive attack’ without knowing if that will be a price war, a marketing CI campaign or new product launches. Also the authors disregarded the fact that some competitive events are

identified late and planned reaction becomes impossible- it needs to be real time reactions. For instance, if a firm loses market share, it may not be in a position to either pursue growth or to seek co-operation due to lack of resources. In considering the Swiss telecom market, like other telecom markets in Europe, certain forms of cooperation are forbidden by the Swiss competition commission (WEKO 2010) in order to prevent monopoly formation.

The approach to decision-making that is examined in this PhD study sees a mix of strategic questions relating to decision-making being relevant (market entry, response to attacks, competitive or collaborative practices etc). Past studies identify three dimensions of decision-making: *organisational* in terms of internal stages by which decisions are made (Badr, Madden and Wright 2006); *content* in terms of the actual decisions undertaken (Ketchen *et al.* 2004), and *resources* in terms of financial or human investment in resources (Spetzler *et al.* 2004). Each dimension noted in past studies of decision-making could be evaluated in this study; however, some of the methods to achieve this would be lengthy (Spetzler *et al.* 2004; Eisenhardt 1999) and would require excellent comparative data. For instance, regression analysis (Papadakis *et al.* 1998) to illustrate content of decisions; or structured quantitatively measured best practice frameworks (Leavitt *et al.* 2004) to examine resource decisions would require access to confidential company information. In addition, a varied range of contextual factor can apply, Papadakis *et al.* (1998) identified *heterogeneity*, *dynamism*, and *hostility* as external context influences, and *firm characteristics*, *performance*, *corporate control ownership*, and *size* as internal contextual factors that can affect decision-making. It is not possible to address each of these factors- this study will examine the link between CI activity and internal decision-making practice in each firm from the perspective of analysts. Therefore, in some firms, specific content might be identified, in another firm, the organisational aspect - the stages involved might emerge as important. In another telecom firm, ownership, firm characteristics or size could have impact on CI.

3.8.1.1 Decision Making, Risk and Resilience

Management decisions concern risk, involving some entrepreneurial orientation that emerge in different business functions (Papadakis and Barwise 1997). Mulcaster (2009) identified risk reduction as an essential component of decision-making, which indicates the importance of CI output as an important source to inform about external risks. Hallikas, Karvonen, Pulkkinen, Virolainen and Tuominen (2004) outlined a risk management process that included risk identification and assessment, implementation of risk management decisions and risk monitoring. In considering the relative sophistication of the CI process across different firms in Section 3.4, we can imagine that risk monitoring might be actively pursued in all firms, regardless of level of CI development. In contrast, CI analysis techniques that address risk management decisions are more likely to be present only in firms with more advanced CI systems.

O'Donnell and Schultz (2005) suggest that the biggest challenge in decision-making occurs with unexpected [competitive] events, noting how past experiences or lack of experience on the part of both analysts and managers can cause impulsive decisions that emerge through late efforts at risk reduction. In a rapidly evolving environment, unexpected competitive actions can trigger reactionary decisions, thus highlighting the importance within CI of early warning analyses. Knowledge of early warning indicators that capture external contextual influences emerge naturally in CI analysis and can help managers in managing their risk behaviour. However, the level of synthesis between CI activity and internal elements (firm characteristics, forms of ownership and structure) may have a more significant impact on the link between CI processes and risk decisions.

Trim and Lee (2007) pointed at the importance of information sharing for an effective intelligence culture. To improve the participation of CI analysts in strategy formulation, Trim and Lee (2007) noted the relevance of a resilience framework within firms - designed to widen understanding of marketing strategy and risk for both analysts and department managers. This creation of an intelligence culture in the firm is perhaps a feature of a firm at an advanced level of CI development. Trim and Lee (2007) explained how resilience links to CI analysis, and particularly to scenario planning:

*“Scenario planning enables staff to find unique solutions to complex, ongoing problems (Graetz 2002) and if coupled with simulation exercises, which can be used to develop an individual’s decision-making skills (Feinstein et al. 2002), can **reinforce the organisation’s resilience** value system by making key decision **makers aware of the changes occurring in the environment** and what the likely impact will be should a certain event/impact materialise.”*

In considering the integrative approach that is proposed for CI in this study, it would involve, as noted in CI Content, a range of both comparative and dynamic analyses and, as noted in CI Synthesis, a solid networking between staff involved in CI (analysts), front line product or service managers and corporate strategists in order to better act on salient risks. The role of CI analysts in this process, as noted by Trim and Lee (2007) centres on ‘making decision makers aware’ of market changes; in a more advanced CI culture, this can contribute to a better understanding of how to act in a resilient manner, when faced with unforeseen competitive threats.

Resilience is salient for Swiss large-scale telecom firms as they compete in a sector with fast-paced technology change and significant competitive change. Within the framework proposed in this study, networking between involved people (analysts and management) and systems is seen as an integrative activity that can enable a firm to develop a better intelligence culture which should encourage readiness to generate decision alternatives and develop optimal choices and a better facility to act in a resilient manner. This is dependent on adaptive change in organisational structures and in CI team organisation, features that are shown in the CI Organisation element of the integrative framework set out in Figure 3.4.

When seeking to develop optimal CI processes, we have noted in Section 3.5 that there is an internal-external dimension to CI Analysis Methodologies in Figure 3.2. When considering decision-making and risk, risk assessment primarily analyses external threats, whereas a CI culture that encourages resilience evaluates the internal capacity to act on threats. Some elements of resilience, identified by da Silva (2012) and Kantur and Iseri-Say (2012) are considered in this study when evaluating how Swiss telecom firms link CI output to strategic management decisions.

3.8.2 Varied Organisational Support for CI input into Decision-Making

When considering decision support key authors have identified relevant steps. The first step is *evaluating preconditions* – comparing conditions for setting priorities. DeVault (2011) evaluated preconditions for data collection strategies. Huovila (2005) evaluated a procedure for a DSS (Decision Support System), which prepares results from other information systems to set priorities – this is termed the *hierarchy process*. Sauter and Free (2005) evaluated a DSS with the element to set priorities at an operational management level. The second step involves *setting priorities* (Porter 1980; Herring 1999). Walters, Jiang and Klein (2003) investigated how senior managers use data filtering to set priorities and DSS can be applied to this process. The third step is *weighting alternatives* (Drucker, Hammond and Keeney 2001). This step requires analysts to identify key components that may be different for each alternative (for example, resources, time frame and level of risk). Where this process of generating salient decision alternatives is in place in firms, the CI analyst, is, in effect, a key decision support who acts in collaboration with management.

McIntosh *et al.* (2011) claim that decision-support tools can change attitudes, behaviours and on-the-ground outcomes. This may depend on having a more developed CI process at firm level, as noted by Yap and Rashid (2011). The degree to which analysts are in contact with management and can apply evaluative analysis techniques to effectively support decision-making is important- but for Dong, Johar and Kumar (2012), this depends on team organisation and may be challenging for firms with developing CI processes. Wagner *et al.* (2002) commented on the need to develop outward linkages from the CI process to other parts of the business system. Table 3.4 below suggests that some criteria for integrative CI activities may be more relevant for organisations at a developing CI stage and other criteria for organisations at a more developed CI stage. Criteria for CI Synthesis are common across firms, whether developing or developed, notably the focus on relevance of CI outputs to audiences and the need to bring in a broad view of what data is relevant.

In summary, when considering CI processes at systems level, it is relevant to assess degree of development of CI core activities and consider how they relate together and

how they lead to information flows across the firm, with both client management and with external market networks.

Table 3.4: Criteria relating to Organisational Support for CI

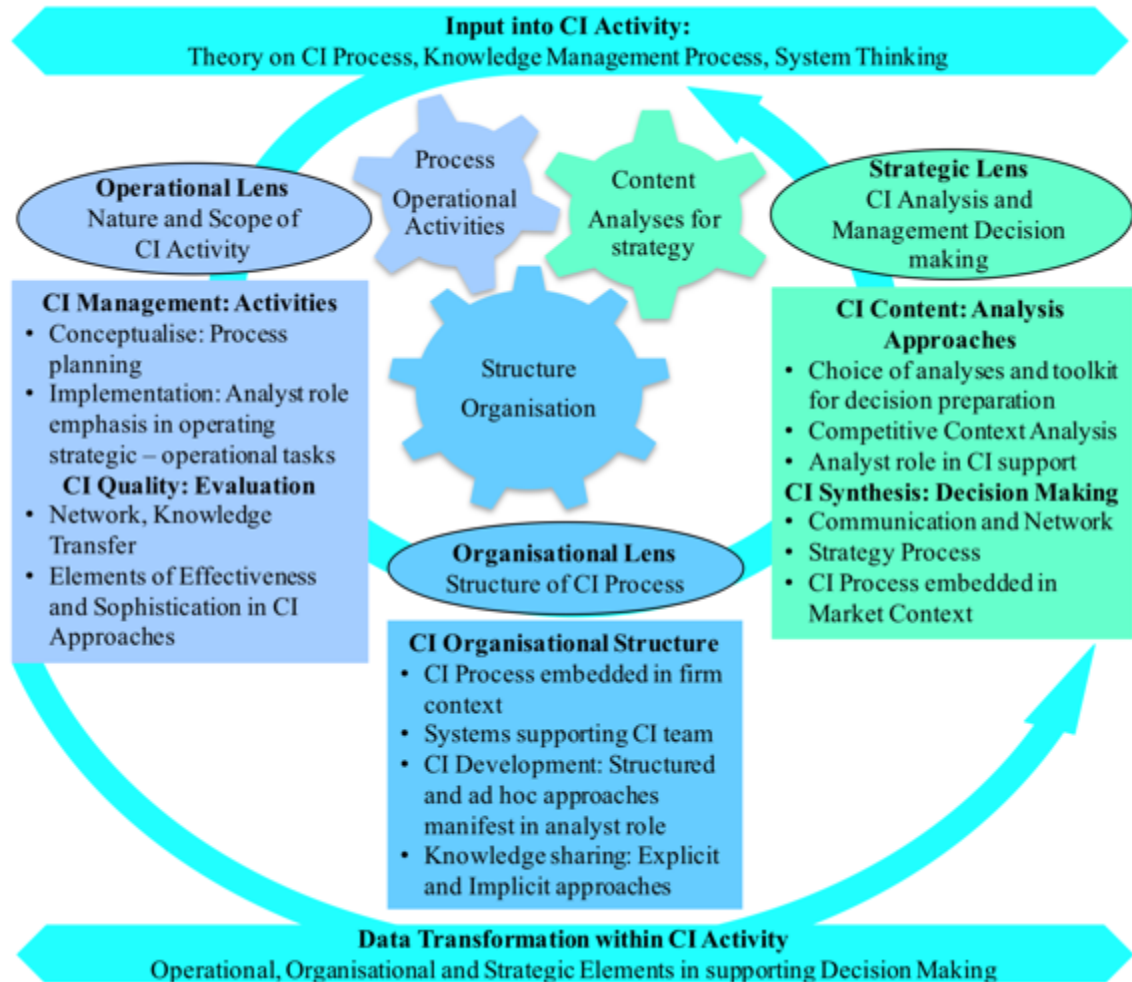
<i>Organisations with Developing CI Process</i>		<i>Organisations with Developed CI Process</i>	
Criteria	Source	Criteria	Source
Developing greater integration of CI process through interdepartmental approach	Britton <i>et al.</i> 1997	Assessing whether formal CI units link to other systems effectively and impact firm performance	Yap and Rashid 2011; Wright <i>et al.</i> 2009
Ensuring that the CI centre is a benefit for information flows to other parts of business system	Michaeli 2008	Generating early CI summaries to respond rapidly to new or advanced CI information	Kruschwitz and Shockley 2010
CI team organisation should lead to quicker knowledge diffusion	Dong <i>et al.</i> 2012	Develop linkages from CI process to systems continuously Adapting CI team structure according to development stage	Wagner <i>et al.</i> 2006
<i>Organisations with Developing and Developed CI Processes</i>			
Common Criteria for CI Synthesis			Source
End users should use CI analysis tools for focused issues. Success criteria include no. of users/ parts of organisations accessing CI tools. Relevant to audiences and creation of user friendly CI outputs			McIntosh <i>et al.</i> 2011
Understanding relationships between internal and external CI information CI info system updated with current information from numerous sources Examining CI data in a broad context (qualitative and quantitative) Generating useful CI reports, identifying relevant management issues, returning good CI summaries for action			Evans 2012

3.9 Synthesis of CI Activities into CI Integrative Framework

3.9.1 Integrative Framework of CI Activities

Figure 3.4 below offers a framework of core CI activities at firm level, adapted by the author from the CI elements highlighted in the above literature review. CI Management deals with the core elements of the CI process. CI Content outlines the data analyses methodologies and the degree to which they provide relevant information for strategy formation (e.g. comparative or predictive analysis). CI Quality assesses the effectiveness of the overall CI Process. At the bottom, Organisational CI focuses on the organisational support to build the CI team and on the right, CI Synthesis identifies the linkages between the CI process and other firm systems.

Figure 3.4: Integrative Framework of CI Activities in Firms



Source: developed by author adapted from Blanchard 2001; Wagner et al. 2006; Yang 2010.

The top box shows that CI activities are informed by CI Process theory, by KM thinking and by systems thinking. First, in terms of CI Process theory, the breakdown into components such as CI Management and CI reflect CI Process thinking (as shown in the work of Choo and Bontis 2002; Ashif 2011, Dishman and Calof 2008). Second, knowledge management underpins the CI Process (Ghanny and Mamlouk 2012), established elements of knowledge sharing and transfer can be operationalised for CI in practice. Including CI Quality as part of the underpinning KM process is therefore a logical step for firms that seek to gain CI synthesis. Systems thinking is evident when seeking to connect CI Activities in an integrative framework. The Association for strategic planning (2014) developed criteria to assess strategic management planning on

the basis of continuously maintaining a body of knowledge, of providing resources for refining *systems*. Criteria relevant to CI are printed below:

- “1. *Uses a systems approach that starts with the end in mind.*
2. *Incorporate change management and leadership development to effectively transform an organization to high performance.*
3. *Provide actionable performance information, to better inform decision-making.*
4. *Incorporate assessment-based inputs of the external and internal environment, and an understanding of customers and stakeholder needs and expectations.*
5. *Include strategic initiatives to focus attention on the most important performance improvement projects.*
6. *Offer a supporting toolkit, including terminology, concepts, steps, tools, and techniques that are flexible and scalable.*
7. *Align strategy and culture, with a focus on results and the drivers of results.*
8. *Integrate existing organization systems and align the organization around strategy.*
9. *Be simple to administer, clear to understand and direct, and deliver practical benefits over the long-term.*
10. *Incorporate learning and feedback, to promote continuous long-term improvement.*”

From Criterion 1, the ‘end in mind’ that is a feature of a systems approach is an integrative view of CI, as shown in Figure 3.4 above. Criteria 2, 3, and 5 deal with content, which can be seen on the right hand side of Figure 3.4 above. Criterion 4 states the importance of assessment and this is included as part of CI Quality in Figure 3.4. Criterion 5 implies the need to set priorities and the importance of adaptation to context, a key element of CI Synthesis. In Figure 3.4 above, Criteria 8 and 10 indicate internal elements needed in the design of a CI process. In considering Criterion 8, alignment of systems is included as part of CI Organisation. Furthermore, Criterion 10 focuses on organisational learning and feedback, which this study also incorporates in the consideration of CI Synthesis.

The Integrative Framework of CI Activities in Figure 3.4 aims to describe CI from a combined perspective, with focus on systems, on operational processes of CI and on organisational elements that support CI. The *operational lens* (box on the left) shows activities from the view of analysts that implement the CI process. The *organisational lens* (box on the bottom) indicates how the organisational structure of the firm and available information systems shape analyst roles and the development of CI approaches. The *strategic lens* (box on the right) shows analyses might inform management decision making. For instance, CI predictive analysis shows possible strategic directions for the firm. The strategic lens emerges in part from systems

thinking - analysts contribute to the KM processes at firm level through knowledge sharing and dissemination that shared knowledge helps to embed CI processes in the business systems and in the firm networks. Thus, everyday activities of analysts (operational), their team role (organisational), have impact in the strategy process if results of analyses undertaken are communicated directly or indirectly to key decision-makers (strategic).

3.9.2 How Integrative Framework reflects Strategic Decision-Making Perspective

From a theoretical viewpoint, three main views underpin strategic thinking; a) a *market-based view* focusing on how the firm fits with and responds to competitive market structures (Bain 1968; Porter 1980); a *resource-based view* that focuses on resources available to firms (Camelo-Ordaz, Martin-Alcázar and Valle-Cabrera 2003; Grant 1991; Morgan and Hunt 1999; Pfeffer and Salancik 1978). and a *relational view*, with greater focus on firm networks as core elements of their strategic thinking (Dyer and Singh 1998). These three views from strategic management (market-based, resource-based, and relational view) can be identified in the conceptualisation in Figure 3.4. Taking a resource-based view, the principle of scarcity (Malthus 1798) applies to the CI process, as the resources deployed to support CI activities have an impact on how well the CI process is integrated with other areas of the business. CI Organisation reflects the resource-based view, through seeking evidence of available resources (e.g. team analysts or analysis toolkit software), whereas CI Content brings in the market-based view through focus on observing and analysing competitive market changes. CI Synthesis reflects the relational view, looking at greater CI integration, by identifying system links and how CI leads towards strategic decision-making.

This study applies some elements of the strategic management structure of Chaffee (1985) to the CI process. Chaffee (1985) noted that strategic management involves both strategy formation, which she called *content*, and strategy implementation, which she called *process*. Both are visible in Figure 3.4 in CI Content and CI Management (process). Additionally, by adding in CI Quality, the link to performance is brought in, offering a focus on the value that the analyses (content) has generated for the firm in terms of effectiveness. Hungenberg (2001) saw systems as an important component of

strategy formation, and the incorporation of this systems view can be seen in the Figure 3.4 which adds in CI Organisation and CI Synthesis components as key components of a holistic CI Process.

In summary, this CI Integrative framework offers a more holistic view of the scope of CI processes at firm level, how such processes are shaped by the organisation and how such processes link to decision-making. In addition, the framework brings in a strategic management perspective with some incorporation of market-based thinking in effective CI Content (quality of analyses toolkits reflects market-based criteria); some resource considerations in CI Organisation (robustness of support is resource-based) and some relational indicators in the degree of integration that has been achieved in CI Synthesis.

3.9.3 Integrative Framework and Focus of PhD Research

The focus of this PhD study is to investigate the CI process in practice in firms (in the Swiss telecom market). This study hopes to offer evidence of how the above CI activities are implemented and to evaluate the link between CI activities and decision-making. The approach taken follows the three theoretical lenses set out in Figure 3.4 – operational; organisational and strategic. Some more specific research foci for each lens of analysis are identified in Table 3.5 below.

Table 3.5: Identification of initial Focus Areas within this PhD research

Lens	Key Focus Areas	Initial Considerations
Operational Perspective	<p style="text-align: center;">CI Management</p> <p>How the CI process is operated in the large-scale Swiss telecoms firms? <i>Here the focus is on the elements of the CI process, set out in Section 3.2 and 3.3</i></p>	<p>Following the CI module view (Dishman and Calof 2008), identification of actual cycle of activities is to be undertaken. (planning, data gathering, analysis). Analyst emphasis on structured and ad hoc approaches (Papadakis <i>et al.</i> 1998), and how the analysts vary in scope and approach to CI analysis of data will be investigated.</p>
Operational Perspective	<p style="text-align: center;">CI Quality</p> <p>How effective is CI and how sophisticated are the CI processes adopted within the chosen Swiss telecom firms? <i>The focus here is on evaluation of the quality of CI processes. See Section 3.4.</i></p>	<p>Ravinchandran and Lertwongsatien (2005) notes variation in IT use and functional capabilities. This PhD study builds on their results by investigating the variation of CI process <i>effectiveness</i>. Key elements centred on firm capability, knowledge of analysis tools and level of IT system support. Hopkins, Lavalle, Balboni, Kruschwitz and Schockley (2010) noted that <i>sophistication</i> of CI analyses was linked with competitive performance. Variation in sophistication is examined in terms of analyst view of use of IT systems, perceived flexibility and ability to inform decision-making. This echoes the approach of Rulke (2000) in emphasis on systems and process elements.</p>
Organisational Perspective	<p style="text-align: center;">CI Organisation</p> <p>How do <i>systems and organisational processes</i> shape the CI process in large-scale Swiss telecom firms? <i>The focus here is on structures that support CI, discussed in Section 3.7</i></p>	<p>Yap and Rashid (2011) claimed that formal CI units link to higher firm performance. In contrast, Britton, Jones, Myers and Sharif (1997) found that decentralised approaches can be of benefit. It is hoped to explore these patterns and identify how organisational structures across firms may support CI. Focus on team organisation and definition of analyst role will also be examined. The pattern of explicit and implicit approaches to CI will be covered.</p>
Strategic Perspective	<p style="text-align: center;">CI Content</p> <p>Which information enables large-scale Swiss telecom firms to act on competitors/or market? <i>The focus is on information that to be used as the basis for CI analysis. See Section 3.5.</i></p> <p>How is this information analysed? <i>The focus is on which analysis methodologies are used and how Swiss telecom analysts apply such analyses. See Sections 3.5.1 and 3.5.2</i></p>	<p>Tashakkori and Teddlie (1998) who identified the need for both quantitative and qualitative sources of data. Scope of information gathering will be identified (e.g. whether ad hoc or systematic). Evidence to be gathered on analysis toolkits in each firm with consideration of comprehensiveness, relevance and whether <i>current with the competitive landscape.</i>" (Evans 2012).</p> <p>Figure 3.2 offers a starting point for categorising the forms and scope of analyses in the firms. Evidence of the different forms of analysis and scope of the analysis (varying from static to comparative analyses to predictive analyses) will be gathered and the analyst interpretation of their own choice of analyses will be recorded.</p>

Strategic Perspective	<p style="text-align: center;">CI Synthesis</p> <p>How can CI analyses <i>support</i> management decision-making?</p> <p><i>The focus is on understanding the degree to which analyses in use support management decisions. See Section 3.8</i></p>	<p>For Campbell (2004), the way a firm turns knowledge into action shows the utility of CI. Perceptions of analysts of the impact of CI on decisions will be gathered. Identification of activities with a short term (operational) and long term (strategic) time horizon will be part of the data collection. Observations on communication (Rulke 2012) and firm learning will be sought</p>
Strategic Perspective	<p style="text-align: center;">CI Content and CI Synthesis</p> <p>How does this information affect the performance of a selected large-scale Swiss telecom firm?</p> <p><i>The focus here is an application of how key indicators can be used to evaluate potential firm performance. See Section 3.5.1</i></p>	<p>The link between the analysis processes adopted and potential decision-making in firms will be explored through an applied scenario analysis. Adapting a scenario analysis template from De Man <i>et al.</i> (2009), a full scenario analysis undertaken, based on real market data. The optimum scenario is then considered. Using the key indicators that are most relevant, an analysis of the main telecom firm (Swisscom) is undertaken to ascertain how far market change data might influence their performance.</p>

3.10 Summary of Chapter

In this chapter, how the nature of the CI process has been represented in past studies has been reviewed in Section 3.2. From the review of key elements of CI Management in Section 3.3, the most relevant CI activities have been identified. Section 3.4 on KM and CI Quality identifies the relationship between KM and the CI process, noting how KM underpins the knowledge sharing elements of the CI process, visible in the assessment of CI quality. Section 3.5 on CI Content sets out the range of potential CI analysis undertaken, based on past studies. Section 3.6 identifies the importance of systems thinking to our understanding of CI in practice and 3.7 offers an overview of how organisational patterns influence the scope, form and effectiveness of CI activity. Additional integrative elements such as approach to risk and links to nature of decision-making are outlined in Section 3.8 under CI Synthesis. Finally, Section 3.9 suggests an integrative framework of CI activities in firms (see Figure 3.4).

In terms of theoretical development of CI, what this chapter has contributed are two relevant theoretical frameworks. Firstly, this chapter has developed a useful categorisation of potential CI Analysis Methodologies, presented in Figure 3.2. Secondly, in Figure 3.4, Figure 3.4, an integrative framework of CI Activities is

presented that offers a more holistic perspective on CI activities in firms. Each of these conceptualisations are further considered in terms of findings in Chapters 5 and 6. In the next chapter, the methodological choices are discussed and justified. Follow through on the three theoretical lenses developed in this chapter is evident in the planning of the primary data collection in the next chapter.

Chapter 4: Methodology

4.1 Introduction

This chapter outlines the methodology adopted in this study. **Section 4.2** outlines the research aims and objectives of the study and **Section 4.3** identifies the overall research approach and research philosophy applied in this research. By adopting a pragmatist approach to the research, both qualitative and quantitative data are identified as relevant. **Section 4.4** justifies the mixed method approach by showing how it contributes to an in depth understanding of the subject under investigation. **Section 4.5** justifies the choice of a case study as research strategy **Section 4.6** outlines the methods of data collection (semi-structured interviews; self-evaluation checklists and document analysis. **Section 4.7** sets out the main research instrument, the interview guide and checklist, showing how they match the research objectives and how they relate to previous literature. **Section 4.8** briefly explains the approach to sampling in the interviews and explains the way the data was gathered in the case study. Finally, **Section 4.9** indicates the approach to data analysis adopted in this study.

4.2 Research Aim and Objectives

The research aim is to understand how the organisation and implementation of the CI activities in large-scale Swiss telecom companies contribute to management decision-making. In seeking to address this aim, three different but complementary lenses of analysis were adopted. The first lens (operational lens) examines the nature of the CI process, with a view to developing a conceptual framework on the one hand, and on the other, gaining evidence on the elements of that preliminary framework from the perceptions from the CI analysts themselves. This led to the following research objective:

1. To identify the nature and scope of CI activities (operational elements) in the four case firms

Elements of the CI process and distinctive patterns of CI activities are identified with reference to the elements in Table 3.5 on page 67. Evidence has been gathered of how each CI activity is addressed across the four telecom firms.

The second lens (organisational lens) involved examining elements of structure that underpinned CI activities in firms – this included both an examination of the CI analyst role and how the role fitted into the organisation structure, leading to the following research objective:

- 2.** To examine how organisational structures shape the CI processes in the four case firms

In addressing objective 2, the variation at organisational level in the four firms is examined by considering the structuring of CI activities in firms and the support from information systems in use. The variation in analysts' roles is examined in the light of CI team organisation.

In addressing these first two research objectives, the research is exploratory in nature, with a focus on gaining insight into how each firm approached the different elements of the CI process, the role of analysts within the CI processes, and the organisational structures – showing potentially explicit and implicit elements – used to support the CI process.

Finally, the third lens of analysis (strategic lens) investigated the link between CI analysis approaches and management decision-making, leading to two objectives:

- 3A.** To evaluate analysis approaches in the four case firms
- 3B.** To identify how analyses potentially support management decision making

In 3A, this study looks at how analysis approaches vary with firm organisation; whether analysis addresses static or dynamic perspectives and the extent to which, comparative and priority setting analyses are used in practice by the four case firms. It is expected that

findings from gathered data will offer insights into perceived effectiveness and sophistication of CI activities in order to understand how variations in system sophistication might link to decision-making through analyses. In objective 3B, through the application of a scenario analysis approach, the researcher seeks to address the extent which predictive analysis links to address effective market context understanding that may feed into strategic management decisions.

The final two objectives were addressed through explanatory research; the *explanatory* nature of the research occurred in the identification of CI process effectiveness and in the assessment of the range of CI analysis methodologies (bringing a more evaluative aspect in data collection and analysis) and in the effort to examine through quantitative analysis how predictive CI analysis could apply to decision-making.

The adoption of the three ‘lenses’ in this study is taken to gain insights into CI implementation and greater contextual understanding of the CI process.

Figure 4.1: Research Objectives with complementary Lenses of analysis

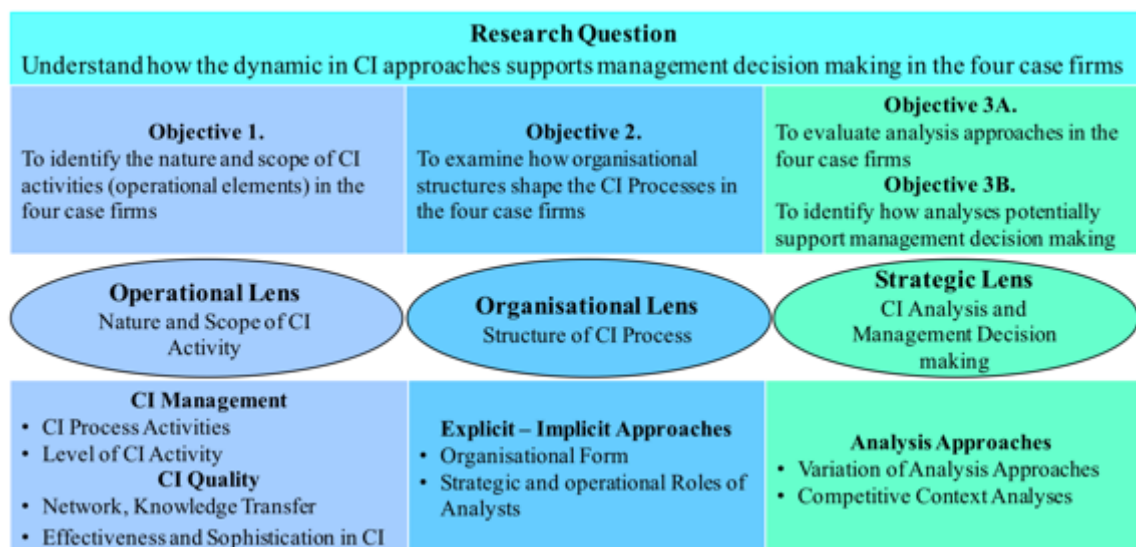


Figure 4.1 outlines how the three lenses of analysis match the research objectives of the study. The research question “Understand how the dynamic in CI approaches supports management decision making in the four case firms” (see Figure 4.1 on top) seeks to understand how each of the three lenses support management decision making by emphasising dynamic elements in CI approaches (Strauss and Corbin 1998).

4.3 Research Philosophy and Research Approach

4.3.1 Research Philosophy

Pragmatism was considered an appropriate philosophical stance for this research. Pragmatism focuses on the research problem (Creswell 2003) and adapts data collection and analysis to it with *no philosophical loyalty to any alternative paradigm* (Mackenzie and Knipe 2006). Additionally, Mackenzie and Knipe (2006) noted that pragmatism *may include tools from both positivist and interpretivist paradigms*. Combinations of interpretivism and pragmatism have occurred in earlier research, notably in symbolic interactionist research (Blumer 1969; Mead 1934). It is therefore no longer a surprising approach (see Goldkuhl 2012), and is relevant in case study research, where different types of data (statistical, documentary, narrative) are often being gathered simultaneously.

Positivist thinking suggests that observable elements are a key basis for conclusions, that deductions based on hypotheses are part of the research approach and that patterns/events that interact may do so in a determinist and regular manner (Collins 2011). The focus on inference drawn from samples to populations is often a distinguishing feature: *“The criteria for categorising positivist articles are the indicators of hypotheses, propositions, model formation, quantifiable measures of variables and the inferences drawn from samples to populations”* (Orlikowski and Baroudi 1991). Easterby-Smith, Thorpe and Jackson (2012) noted key characteristics of a positivist approach:

- *Independent* as the observer is independent from the observed objects
- *Value free* as objective criteria determine what to study
- *Causal* as causal explanations and laws explain regularities in social behaviour
- *Generalizable*- inferences to a wider population can be drawn (if sufficiently big sample size)

In contrast, interpretivism is not seeking causality or generalisability; it aims to *understand human experience* (Cohen and Manion 1994), and usually suggests a *socially constructed reality* (Mertens 2005). It is concerned with social rules, meanings, and interpretations (Orlikowski and Baroudi 1991) that are rooted in actual contemporary experience.

Both perspectives are important to this research. First, in this PhD study, when examining both the nature of the CI process and the structure to support CI activities, the researcher seeks to get an in-depth perspective that is drawn from analyst descriptions of their lived experience of their CI role and the CI activity in their firms. The researcher therefore takes an interpretivist perspective at this stage of the research, in accordance with the arguments of Chen and Hirschheim (2004), who identified the interpretivist perspective as the relevant one, if the positivist indicators of hypotheses, model formation and quantifiable measures are missing. The interpretivist perspective can be characterised as follows: *“Participants’ perspectives are taken as the primary sources of understanding and investigating the phenomena [and] the phenomena are examined with respect to cultural or contextual circumstances”* (Walsham 1995). In this study, participant (analyst) perspectives were the primary source of understanding to capture a clear understanding of ongoing CI activity that was occurring across firms in the study.

Chen and Hirschheim (2004) explain that interpretivism emphasises subjectivity towards a social reality while positivism emphasises objectivity and independence of observable events from a social reality. Orlikowski and Baroudi (1991) distinguish interpretivism from positivism through social constructionism. They view reality as emerging, as a social product that needs to be understood by the actors¹ (researchers and research subjects). The social world is not given but changes through human action, interaction, and negotiation. In this study, actors (CI analysts) view reality from their firm perspective - and the market perspective is regarded as incomplete, it is emergent.

4.3.2 Research Approach

The interpretivist approach, although the primary approach to gaining insight into the CI process and its implementation at firm level, and addressing research objectives 1, 2, 3A and 3B, above, was less useful in evaluating CI activities of firms in terms of effectiveness and market impact, which was important for research objectives 3A and 3B. A postpositivist approach was therefore considered. Benbasat, Goldstein and Mead (1987) followed a positivist approach to their study, but they admitted that investigators

¹ Researchers and informants

often filter the facts through their *subjective lenses*, which implies that their approach is postpositivist. Creswell (2007) identified the elements of the postpositivist approach as: a) *Reductionist* to explain terms of ever smaller entities; *Logical in terms of* emphasising empirical *data collection*; *Cause-effect* oriented and *Deterministic* in the view that events have causes and research is based on a priori theories. In this study, in the later phase of data collection, it is hoped to gather relevant quantitative indicators (empirical), it is hoped to generate a scenario that utilises market assumptions (cause-effect) in order to construct an analysis that might predict potential firm actions (logical) based on both the market assumption and the data. It thus conforms to a postpositivist approach. A postpositivist approach which could make a cause-effect link, although tentative; which focused on empirical data and followed logical analysis enabled a more robust consideration of how the firm activity matched with the sector context. This was adopted in the explanatory stage of data collection and analysis to address Objective 3A and 3B in particular.

A pragmatist approach overcomes some of the limitations of adopting either a purely interpretive approach or a purely positivist approach. Taking a purely interpretivist approach has limitations. Goldkuhl (2012) has noted how the interpretivist approach focuses on the situational context of the research and examines in a more limited way the consequences of events or the more systematic patterns that might emerge from examining historical change over time. He emphasised that interpretivism aims to understand and interpret, which shows the limits of this epistemological orientation towards understanding changes.

Dewey (1925) saw transaction as main element of pragmatism replacing the view that reality can be distinguished into subjective and objective stances (Descartes 1985; Hume 1975). Dewey (1925) replaced the epistemological orientation to knowledge by the concepts of inquiry or experimental logic. The aim was to have an orientation that suited his own approaches to research. He argued that events are connected through patterns of change and development, any given event arises from prior conditions leading to consequences. Dewey's worldview about pragmatism is still accountable for debates in various research areas. For example, for Information Systems Research, Biesta (2010) discussed the scholarly debate whether pragmatism can be seen as a

paradigm justifying a mixed method research or offering insights about mixed method approaches within one research.

Goldkuhl (2012) argues that “*pragmatism is concerned with action and change and the interplay between knowledge and action*”. When investigating the link between knowledge and action, Goldkuhl (2008) subdivided pragmatism into three types with underlying questions; a) *Functional pragmatism*, where knowledge is a means to change actions; b) *Referential pragmatism* (knowledge about action) where knowledge is a means to describe actions and c) *Methodological pragmatism* (knowledge through action) where knowledge is based on actions (How knowledge). Applying this insight to this PhD study, *referential pragmatism* is the most relevant, as the focus of this study lies in gaining knowledge of CI processes, structures and activities as a means to understand the link to management action (decisions). This understanding is gained by analysing data from the identified cases.

Hall (2013) criticised the pragmatist approach when stating: “*It fails to give a coherent rationale for mixed methods due to its lack of a clear definition of ‘what works’.*” Nonetheless, many authors see value in pragmatist thinking (for example Feilzer 2010; Morgan 2007).

A pragmatist approach also avoids the rigid nature of a purely positivist philosophy in which there is reliance on a priori conceptual development and deductive reliance on hypotheses and their measurement (Johnson and Onwuegbuzie 2004). A postpositivist approach admits that reality cannot fully be measured (Schroeder 2008; Guba 1990; and Burrell and Gareth 1979) implying some elements of variability in outcomes, some lack of deterministic conclusions and some subjective influence. In this regard, it does not negate the social constructionist view of reality that an interpretivist philosophy typically adopts – in this study variability in analysis is acknowledged, deterministic conclusions are not emphasized, rather, the quantitative elements in the study are seen as probable scenarios, with possible future actions that follow that scenario.

Tashakkori and Teddlie (1998) emphasise that within pragmatism a mix of the most appropriate methods applies and note how, for each stage of research (data collection,

analysis, and inference) a change of paradigms is possible. This PhD study seeks to understand the experience of the CI process in the selected firms and to examine the contextual conditions from the view of the respondents. Therefore, a pragmatist approach is preferred as it allows the researcher to take an interpretivist stance when examining the evidence that reflects the respondents experience, but it also permits the researcher, in addressing the third lens of analysis to develop and apply some systematic, evaluative analysis of the context in which the firms are operating. Both paradigms (interpretivist and postpositivist) are drawn upon in this research in order to address the research questions effectively, thus leading to a pragmatist philosophy and a mixed methods approach in data collection.

4.4 Justification of Mixed Method Design

Johnson, Onwuegbuzie and Turner (2007) analysed the definitions of research design from leaders of the field and found strong agreement that mixed method research includes qualitative and quantitative research:

“Mixed methods research is the type of research in which a researcher or team of researchers combines elements of qualitative and quantitative research approaches (e.g., use of qualitative and quantitative viewpoints, data collection, analysis, inference techniques) for the broad purposes of breadth and depth of understanding and corroboration.” (p 123)

Greene, Caracelli and Graham (1989) further identified five rationales for conducting mixed method research:

- *Triangulation*: seeking convergence and corroboration of results from different methods and designs studying the same phenomenon.
- *Complementarity*: seeking elaboration, enhancement, illustration, and clarification of the results from one method with results from the other method.
- *Initiation*: discovering paradoxes and contradictions that lead to a re-framing of the research question.
- *Development*: using the findings from one method to help inform the other method.
- *Expansion*: seeking to expand the breadth and the range of research by using different methods for different inquiry components.

The research objectives that are part of this study point toward the *complementary* and *expansion* arguments, as the different methods offer some elaboration that can complete the key findings, and the different inquiry components enable the researcher to investigate a range of research questions. A *complementary* approach (Greene *et al.*

1989) is important when addressing research objectives 3A and 3B, where an understanding of the CI analysis methodologies that are being used emerges from a qualitative approach that draws on interview data, but the result of the implementation of those methodologies requires specific indicators to be selected, which calls for a quantitative approach. In looking at all the research objectives, there is an element of *expansion*, (as noted by Green *et al.* 1989), where the CI process is examined from different viewpoints (as noted in the outline of three lenses of analysis above). The expansion characteristic of mixed method research is captured by Creswell (2007), who noted how mixed method research typically draws data from multiple sources (observation, interviews, documents, surveys etc), thus offering the possibility of triangulation and flexibility in the reporting of findings.

Ponterotto, Mathew and Raughley (2013) emphasised the importance of carefully designing a mixed method study to overcome the inherent challenges of mixing quantitative and qualitative data types. Ponterotto *et al.* (2013) feared that within mixed method research, there is a dilution of design by trying to do too much in a single study. This study avoids this by identifying within the pragmatist position the value of each kind of analysis (qualitative and quantitative) and identifying how that kind of analysis is appropriate for different objectives. Qualitative data, it is often argued, can provide answers on how and why questions. De Villiers (2005) described the qualitative approach as '*documents and artefact studies, ethnography, focus group, and case studies*'. Anderson (2006) characterised the qualitative approach as '*subjective, interpretive, context dependent, and answering research questions*'. In gathering qualitative data in the Swiss telecom context, only the CI analysts can offer comprehensive information about the implementation of the CI process in their firms – thus examining their experience enables two strengths of qualitative analysis to come to the fore – the purposive nature with a focus on the meaning of the respondent experience and the inductive inquiry that allows themes to emerge. For instance, the CI activities Framework compares and evaluates the interview findings by interpreting from the qualitative data *how* the CI process is conducted in the firms. The focus on patterns of organisational structure and support for the CI process emerges from a close reading of the analyst transcripts when describing their role, the interactions they have within their firms and in the microenvironment and the communication pathways that

operate at firm level.

Quantitative data are typically data that can be measured. De Villiers (2005) described the quantitative approach as '*theorem proving, mathematical modelling and simulation, controlled experiments, field experiments, quasi experiments, and testing*'. Anderson (2006) characterised the quantitative approach as '*objective, measurable, context free, causation, and hypothesis testing*'. The identification of the systems, technology and toolkits used for CI analysis involved data gathered from rating scales (quantitative) on analyst checklists – this enabled the researcher to gain a clear picture of the relative effectiveness of processes within firms, and encouraged the use of a systematic data for cross-case comparison.

4.5 Choice of Research Strategy – Case Study

Case studies represent an intensive study of a case or context (Trochim 2007). Farquhar (2012) noted that case studies should meet quality criteria. Denscombe (1998) characterised a case study as being appropriate for many contexts, in particular to investigate processes and relationships. In addition, he notes the natural setting that permits multiple sources and methods. As the focus in this PhD research is clearly on CI processes, on the structure of relationships that support CI activity and on locating data in a natural setting, a case study approach was a natural choice of research strategy in this study. Feagin, Orum and Sjoberg (1991) found that the grounding of observation and concepts in natural setting studied at close hand, allows a more holistic study as a number of sources are used over a period of time. The wide-ranging perspective on research that a case approach offers attracts many researchers. Creswell (2007) views a case study not just as a method of research design, but also as an object of study, as well as a product of inquiry, whereas Yin (2009) saw it as a platform to generate new questions. Hammersley (1989) emphasised that case studies are concerned with the variety of traits in contrast to statistical methods that are concerned with the distribution of traits. Yin (2009) emphasised that cases with similar characteristics to others of its type can give a typical pattern for those kinds of firms, notably, an organisational setting, sector specific trends, or technological changes. The opportunity for comparative analysis that offers insight into a typical setting (in this case a telecoms

sector where technological discontinuity and its impact on competitive activity is observable) was important to the researcher.

The unit of analysis in this PhD study was each of the four case firms – Swisscom, Sunrise, Orange and Cablecom. Eisenhardt and Graebner (2007) emphasised a need to choose cases that allow the researcher to develop emergent theories, which is the case in this PhD study. Eisenhardt (1989) identified that theoretical case selection focuses on theoretically useful cases, which was the case for this study as well. Eisenhardt and Graebner (2007) emphasised to choose cases that allow to elaborate emergent theories, which is the case in this PhD study. Charmaz (2006) explained that theoretical sampling draws new data to develop emerging theories. For the case firms, a follow up interview was conducted to show if new properties emerge (see Appendix VI). Patton (2002) explained that: *“the key issue in selecting and making decisions about appropriate unit of analysis is to decide what it is you want to be able to say something about at the end of the study.”* The choice of the large scale Swiss telecom firms as unit of analysis enabled to study patterns of CI activities.

The cases were selected by choosing the main Swiss telecom firms (see Table 2.3). The theoretical categories were identified following the research objectives (Charmaz 2006), to identify cases that enabled to understand the phenomenon. The choice of the main Swiss telecom firms enables the researcher to analyse approaches to CI that dominate the Swiss telecom sector. It was expected that the firms conduct CI due to their saturated markets, which enables to study their CI activities (Research Objective 1). Despite some similarity in size and service offers, the cases show organisational variation – which permitted some sector patterns for the Swiss telecom market (Eisenhardt and Graebner 2007) to be established: two of the firms operate in a firm centred way – Swisscom and Sunrise, the other two firms have headquarters – Orange and Cablecom, which enables to focus on organisational variation (Swisscom 2011a; Sunrise 2011a; Orange 2011a; Cablecom 2010b) as indicated in Research Objective 2. This is noteworthy, as the firms compete against each other for customers (BAKOM 2011). The technological fast paced and saturated telecom market (Brändle *et al.* 2012)

was chosen to study their analysis approaches and support for management decision making, which shows their adaptiveness on market changes (Research Objective 3).

It is important to consider when it is appropriate to apply the case study method. This study aims to understand how CI processes link to strategic decision-making in a given context (telecoms) and how firms action competitor intelligence in their decision-making. The focus is on the functionality of the CI process and how information is channelled toward decision-makers. The case study approach is appropriate as it enables the researcher to probe processual elements effectively. Decision-making of a telecom firm depends on market conditions (developments, competitors) and the case method is helpful in understanding firms and their situational development (BAKOM 2011).

For this PhD study, while a survey could provide measurable data; it would fail to offer those key insights that encourage a researcher to really comprehend what is going on – a case study enables insight into specific patterns that emerge for one concrete decision, and the processes behind this – how firms act in the situation. To understand elements of competitive intelligence in firms it is necessary to learn directly from the key personnel responsible for it. A case study method permits this – one feature of the method is the focus on gaining relevant data from key personnel in the research context, as noted by Denscombe (1998). Denscombe (1998) noted four key characteristics of a case study as: in-depth investigation, the natural setting, insight into processes and relationships, the use multiple sources and methods, in a longitudinal or cross sectional time frame – each of those characteristics enable a researcher to better understand the reality of a situation. The first three of those characteristics are important to this study- the depth of insight, the insight on process that can be gleaned and possibility of multiple methods. According to Baxter and Jack (2008) a case study design should be considered when:

“(a) The focus of the study is to answer “how” and “why” questions; (b) you cannot manipulate the behaviour of those involved in the study; (c) you want to cover contextual conditions because you believe they are relevant to the phenomenon under study; or (d) the boundaries are not clear between the phenomenon and context.”

Table 4.1 below, which summarises four criteria, adapted from Baxter and Jack (2008) and Yin (2009) that suggest when a case approach is useful.

Table 4.1: Criteria for applying a Case Study Method

Features	Study
Focus on “how” and “why” questions	Understand the CI process in relation to strategic decision-making
Manipulation of the involved not possible	The CI analysts can not be manipulated through the process by external observation
Contextual conditions are relevant	The telecom market is adapting rapidly to technological (BAKOM 2005). Competitors, technological developments, and organisational changes shape the telecoms’ service offers
No clear boundaries between phenomenon and context	Decision-making of a telecom firm depends on market conditions (developments, competitors), therefore context

Adapted from Baxter and Jack (2008) and Yin (2009)

The case study is a versatile form of research – Trochim (2007) noted that qualitative and quantitative approaches to case studies are both possible and in combination they offer good tools for analysis. A significant advantage of the case study method for this research was the versatility of data collection that it permits – on the one hand, through a contextual focus and, on the other hand, the flexibility of using multiple sources of data. Baxter and Jack (2008) note how contextual conditions can be implemented in case study design. The context of this study includes both internal and external dimensions of competitive intelligence – the case study approach allows the assessment of context specific conditions for both dimensions.

The case study method often draws data from multiple sources (Creswell 2007), and can employ multiple research methods (Trochim 2007; Denscombe 2007). Yin (2009) noted that quantitative data delivers numeric information, while qualitative data explains what lies behind the numbers – a mixed method approach that often characterises case study research allows researchers to deal with those elements in a research setting that cannot be fully answered through direct measurement. This was important to a study that aimed to use both qualitative and quantitative elements of analysis.

The case study method has proved effective in previous research. Arman and Foden (2010) used the case study method effectively to develop their study of technology intelligence; incorporating meetings with key players, collecting data through interviews, evaluating technologies and developing scenarios through workshops. The research data that emerged from different settings within the field research led to useful

insight into their understanding of technology intelligence. In this PhD research, varied settings will be part of the process – meetings in offices, information via email etc., therefore the versatility of the case method will suit the potential data collection that is envisaged.

In considering the specific cases to be studied, due to the focus on competitive intelligence activities, similarity of competitive rivalry factors were key factors. From the overview of structure of the telecom sector, outlined in Chapter Two, the position of the four firms (Swisscom, Cablecom, Orange, Sunrise) as significant players in the market has been established. Despite this outward similarity of competitive rivalry, it is believed that studying the CI activities of each firm in their own context; (an important feature of the case study method, as noted by Feagin *et al.* (1991), can offer the opportunity to gain insight into the specific perceptions of competitiveness that may drive each of the firms in different directions in their competitive intelligence activities.

Similar to the study of Rohrbeck (2010), the cases selected from the Swiss telecom sector are an appropriate object of study due to a similar technological discontinuity in the sector. The cases are exemplars of a context where CI activities are very important due to the discontinuous pattern in the replacement of technologies. Discontinuity can create significant competitive pressures, both internal and external, as firms have to react appropriately. The four large scale Swiss telecom firms were chosen cases in this study because they are exemplars of organisations that operate in a sector where technological discontinuity is significant and where the management of the competitive environment is critical to firm success. The CI process and the implementation of CI activities are not just important – they are crucial to firm development. In this sense, the chosen cases are relevant competitors, that are operating in a similar, highly evolutionary competitive setting (Benzoni, Defains, Nguyen and Salesse 2011; Alden 2002) and are potentially information-rich in terms of the scope of CI activities that they might engage in (Chesbrough and Rosenbloom 2002; BAKOM 2011). Comparability of firms (size, scope of activities) was also a consideration (Benzoni *et al.* 2011; Ghezzi 2011; Vassilopoulou, Ziouvelou, Adamantia Pateli and Pouloud 2003). Examining four similar companies (similar in size, scope of activities, technology, sector) enabled the researcher to conduct cross-case comparison (Yin 2009; Ghezzi 2011). Rohrbeck (2010)

applied cross-case comparison to research discontinuous technological changes, noting that telecom companies are experienced in dealing with this issue and the case analysis enabled him to understand the response process of firms. Barnes, Hinton and Mieczkowska (2003) used a cross case analysis to contrast their findings on themes and issues within e-commerce processes for specific organisations. Their case study approach enabled them to get an in depth understanding of firm processes. In this PhD study, the cross-case analysis of telecommunication firms that the case method offers will offer a way to compare how each of the firms' process competitor intelligence in relation to the others.

4.6 Methods of Data Collection

This section explains the methods of data collection applied for this study, namely the semi-structured interviews undertaken with CI analysts in each firm, the self-assessment checklists that were used as part of the interview, the company documentation that was analysed and the scenario analysis that addresses developments in the telecom sector.

4.6.1 Semi-Structured Interview

Newton (2010) characterised an interview as a *managed verbal exchange*, whereas Cohen, Manion and Morrison (2007) see it as interpretation of experience:

*“Interviews enable participants to discuss **their interpretations** of the world in which they live, and to express how they regard situations from **their own point of view.**”*

This was important in the research undertaken; as noted above, the contextual setting or natural setting (see Trochim 2007) was expected to be a key differentiator of CI process development. Cohen *et al.* (2007) noted several functions of an interview, ranging from *evaluating a person in some respect; to effecting therapeutic change, as in the psychiatric interview; to developing from the interview data some hypotheses; to sampling respondent opinions*". In comparing the value of interviews with surveys, Cohen *et al.* (2007) noted the opportunities for asking many probing questions in a depth interview approach. Yin (2009) expressed that interview data by pointing at its opportunity to understand meaning instead of closed answers. When researching the telecom's CI processes, it is apparent that these thematically intervened with competition, internal structures, the way analysts understand CI, and their organisational

and personal background. These arguments show the importance of choosing a method that enables the researcher to understand. Follow up questions posed during the interview enable the researcher to better understand. Furthermore, Yin (2009) noted that it is possible to schedule several interviews with the same interviewee. The researcher gained from that opportunity through a follow up interview conducted by email with one of the respondents in 2015 to understand the development of the firms.

In identifying why an interview method was appropriate in this research setting, three considerations applied. First, the adoption of the semi-structured interview sought to achieve in-depth understanding of CI activities and clear insights into the nature of the CI processes of each of the four large-scale telecom firms. Kvale (1996) noted the need to “conduct interviews with *as many people as necessary in order to gain the information sought.*” This was done in this study by including at least one CI analyst of each firm in the interview sample; where possible a number of analysts from a firm were included in the study. Second, the researcher adopted what Patton (2002) described as *the interview guide approach*, which was felt to be appropriate for *firm level* investigation. Within a semi-structured interview, the interview guide allows flexibility of direction in terms of respondent’s own experience, while ensuring that all necessary topics are addressed in relation to CI activity across firms to permit cross-case comparison of interview data. Third, the versatility of the case study strategy is mirrored in the adoption of a semi-structured interview method when gathering data. A semi-structured approach allows the researcher flexibility to refer to documents that are pertinent to the discussion (see next section); enables further probing (Creswell 2013) of key contextual issues relating to organisational support and the nature and effectiveness of interaction between CI tasks (performed by analysts) and strategic decisions (performed by management).

Past studies in CI have also successfully used a semi-structured interview approach. Ferrier (2001) conducted a study using the interview method about sequences of competitive actions, which accounted for differences in strategy and performance of two companies across a seven-year period. GIA (2005) conducted 287 interviews within 100 firms, generating some significant insights into the nature and status of CI activities in firms and a better understanding of variation in CI activities across firms in eight

countries. An interview method was seen as useful in this study as a route to capturing variation – the interview guide enables respondents to give their own interpretation of events, and to clarify (Easterby-Smith *et al.* 2012) what their CI analysis experience means and how that experience might differ across individuals. Phellas, Block and Seale (2012) noted how the interviewer can act on non-verbal clues, and may structure the interview to match respondent experience. Each of these characteristics (flexibility, clarification, adapted structure) were seen as necessary in order to get comprehensive insight into the CI process.

Finally, in this study, the researcher was interested, as stated above, in gathering a more evaluative perspective on the range of CI activities in order to generate some cross-case comparison. In this regard, the format of the semi-structured interview enabled the researcher to encourage respondents to evaluate their own CI processes. This was, in part, achieved by asking respondents to indicate those areas of their CI processes (perhaps elements within the Integrative Framework of CI Activities) that were perceived to be effective and areas that were perceived to be less effective. It was also achieved by means of a self-evaluation checklist.

4.6.2 Use of checklist

To supplement this and to generate some cross-firm comparison, a checklist was used at the end of each interview. This checklist allowed analysts to identify their own assessment of the effectiveness and the sophistication of their CI processes using Likert scale choices. In evaluating the specific CI process used by firm, other authors have adopted a checklist approach (Saayman, Penaar, De Pelsmacker, Viviers, Cuyvers, Muller and Jegers 2008; Calof and Dishman 2002). These checklists provided valuable information about the implementation of CI processes and were therefore adopted in this study. One disadvantage of this procedure is that firm-specific issues could not be revealed, but it was hoped that some of the specific circumstances that were relevant in each firm could emerge in the conversation that occurred in the semi-structured interviews. Both elements – the checklist and the in-depth interview data offered a balanced perspective when gaining a more evaluative perspective on the range of CI activities, as reported by respondents at firm level.

4.6.3 Documents and use of Secondary Data

Cohen *et al.* (2007) argue that secondary data may be used to supplement primary data and this was considered important in this context. Some past CI studies that gathered and analysed secondary data include the work of Jaworski and Wee (1992), examining the relationship between CI and business performance. One of Jaworski and Wee's aim was to summarise published literature on the strategic role of CI and report the empirical evidence of CI benefits. In this study, secondary data was drawn from company reports (Swisscom 2013f; Sunrise 2010; Orange 2011a; Cablecom 2010a); from statistics generated by the Federal Office of Statistics (BFS 2010; Brambilla 2010; SAKE 2010a; SAKE 2010b). Company reports for all four firms were accessed from their web-pages; and some reports for Swisscom were accessed through archives of the Swiss Postal Office. Other company documents such as Swisscom Sharepoint (2010) and MTV mobile (2010) sometimes formed the basis of discussion in the semi-structured interviews. Ghezzi (2011) used secondary sources to complete the interview data in his study about the Italian mobile phone market. Hall (2010) used secondary data to better understand the culture being studied.

4.6.4 Scenario Analysis

The *scenario analysis* used secondary data from the Swiss market, identifying the most probable scenario for the sector and then analysing performance for one firm in the light of the identified market scenario. The purpose of the scenario analysis was, as outlined in Objective 3B, to show a methodology for CI analysis with predictive purposes. At the core of the scenario analysis is an evaluation of possible future directions or scenarios, which can then be a basis to develop strategic plans (Maack 2001). Franco, Meadows and Armstrong (2013) noted how scenario analysis can deal with the uncertain future of a firm's environment, but scenario approaches are limited as the future is unknown (Postma and Liebl 2005). Due to some *inherent methodological restrictions* of scenario analyses, Postma and Liebl (2005) suggest three alternative ways to construct scenarios – *recombinant, context and inconsistent scenarios*. The recombinant scenario approach applies trends from indicators, rather than drivers of scenarios, selecting a subset of trends for each scenario. An advantage of this approach is that drivers connote with causality, yet establishing causality among drivers is of limited validity due to the

subjectivity in choice of indicators. Statistics can only show if two drivers are related but not why (Stahel 2007) and verbal reasoning is limited as well, due to the nature of scenario analyses dealing with uncertain future events. A recombinant scenario analysis that seeks to identify and utilise data on the most logical trends was applied following the recommendations of Postma and Liebl (2005) and the recommendations of Gregory and Duran (2001) to:

“use concrete examples, use representative events, use easily recalled supporting evidence, use commensurate measures across alternative scenarios, even if irrelevant.”
Ringland (2002) noted how: *“It may not be necessary to develop scenarios: discussion of existing ones may provide the desired framework for discussion and decision.”*

Ringlands' (2002) recommendation is followed in this study- a scenario analysis that is based on a previously successful approach by De Man, Lugtigheid, Sardjoe, Budde and van Hemmen (2009) was adapted to the Swiss telecom market. This approach satisfied the requirements of having similar market characteristics as the Swiss telecom market, notably rapid technological development, an oligopolistic market structure, saturated demand levels and a small but developed country. The analysis of the Swiss telecom market from Brändle *et al.* (2012) was applied to identify these characteristics. The Dutch telecom market was relatively similar in terms of telecom competitive developments and the scenario analysis from De Man *et al.* (2009) was used as a basis to be applied to the Swiss market. The identified trends from Lewrick, Schiffer, Jung and Georgi (2010) for the Swiss IT sector were reconsidered in the light of contextual issues in the Swiss market (some noted in the interviews and in the checklist data of respondents), leading to adaptation of the scenario analysis from De Man *et al.* (2009) to reflect relevant issues (e.g. past data on new entrants in previous three years). This *industry level* analysis offered information about possible future directions of the Swiss telecoms and could enable some evaluation of current CI processes of a firm against a most probable scenario.

4.7 Development Research Instruments

4.7.1 Link between Interview Themes and prior Literature

Table 4.2 provides an overview of how the interview questions match with the research objectives, with key sources and expected insights sought by researcher.

Table 4.2: Overview Interview Questions, key Sources and Insight sought

Research Objective	Interview Question	Key Sources	Insight sought by researcher
1. To identify the nature and scope of CI activities (operational elements) in the four case firms	Please describe how your firm processes competitor information.	Dishman and Calof 2008	CI modules or alternate CI process
	Please describe how your firm uses their information systems.	Krizan 1999; Weiss 2002	Specific intelligence Criteria
2. To examine how organisational structures shape the CI Processes in the four case firms	Please describe how your firm communicates subsequent information. Describe, which people and systems are involved. Describe which stations information is taking.	Turban <i>et al.</i> 2005	Information systems for data management: gathering, storage and analysis
		Miller 2008	Implicit - explicit knowledge
		Liu, Raahemi and Benyoucef 2011	Explicit approaches apply rules, models, and collaboration
	Strategic – operational attitude towards CI Checklist: Job title and department	Nonaka 1994	Implicit approaches are informal (ad hoc), rooted in action, commitment, values, emotions
		Ketchen <i>et al.</i> 2004; Larson 1992	Strategic: market entry; respond to competitive attack; growth; compete or cooperate Operational: emphasis on communication and systems
	Overall: Please describe how your firm designs and realises CI information flows.	Gnyawali and Madhavan 2001; Rulke 2000	Internal and external networks Networks support organisational learning
3A. To evaluate analysis approaches in the four case firms	What system for your firm links competitor information with its strategic decision-making process?	Kruschwitz and Shockley 2010; Larson 1992	Applications of advanced systems to support communication; Integrate communication and information systems
	Assess the CI development of your firm since you work here	Campbell 2004	Recommendations for turning knowledge into action
	What type of information serves as an early warning indicator?	Trim and Lee 2007	Recommendations for the development of firms
3B. To identify how analyses potentially support management decision-making	Additional question: Can you describe your analytic approach / toolkit?	Mullekom and Vennix 2004	Indicators that are seen as important
		Rouibah and Ould-ali 2002	Interpret information from the market

4.7.2 How Interview and Checklist matches three Lenses of analysis

The purpose of the semi-structured interviews in this PhD study was to address the three lenses of analysis that were set out in Section 4.2 above and each is noted in Table 4.3 below.

Table 4.3: Link between Lenses of Analysis and Research Method

Lens of Analysis	Focus	Method
Operational: What are the key elements of CI process in Firms	<ul style="list-style-type: none"> • Explore elements of the CI activity framework • Analyst role implementation in firms to operate strategic – operational tasks • Insight into CI activity applications 	Semi-structured interviews Self-evaluation checklist with analysts
Organisational: Structure supporting CI Activities and CI Analyst Role	<ul style="list-style-type: none"> • Focus of CI activity in firms as strategic or operational • Analyst role manifest for CI development as ad hoc – structured • Knowledge sharing as explicit – implicit • Insight into organisational side of CI activity 	Semi-structured interviews, self-evaluation checklist with analysts
Strategic: Link between CI processes and Decision-Making	<ul style="list-style-type: none"> • Classification of applied analysis toolkit in firms • Analyst role in supporting decision making • Evaluation of effectiveness of CI approaches • Insight into adaptation to market changes 	Comparison of case firms Scenario analysis

An overview of the schedule of interview questions and how those questions reflect the research objectives is shown in Table 4.4 below.

Lens 1: What are the key elements of CI process in Firms using the CI Activity Framework

The respondents were prompted throughout the interview to explain their CI processes, as can be seen in Table 4.3. These questions relate to some degree to the work of Dishman and Calof (2008) in their description of CI modules, but recognizes Krizan’s (1999) view that the intelligence process must be firm specific to be relevant, and would thus deviate from CI modules. The questions sought to explore all elements of the Integrative Framework of CI Activities, for instance, the identification of information systems and specific applications on the part of analysts of the Swiss telecom firms. The follow up checklist provided information about which information systems were used for data gathering and analysis and further probing questions that asked analysts to

identify issues were in line with Evans (2012). Evans (2012) argued for analytical approaches to be forward-looking, relevant to the company, free of bias, and current with the competitive landscape. Respondent interview data can offer insight into the degree to which these criteria may have been achieved. CI Content was examined in terms of which data the firms considered as important to monitor and gather, and how they analysed these data. The results are later compared with the results from the market context analysis (see Section 6.6) in comparing CI analyses in firms and from the sector. Respondents were asked what firm information was gathered that served as an early warning indicator, thus following through on the work of Mullekom and Vennix (2004), who provided early warning requirements. The checklist provided information about the impact of CI Content on firm competitive behaviour, and covered the ideas of Gnyawali and Madhavan (2001), who analysed likelihood of attack and respond of competitors. In considering the link to performance, the checklist followed Liu and Song's (2007) analysis that linked market indicators of change to firms' profit.

CI Quality was analysed by linking actual reported practice by analysts to their own self-evaluation of their CI activities in terms of effectiveness and sophistication. This is discussed in detail under Section 4.8 below. CI Synthesis provided insight into how the CI Activities were applied, by asking respondents to describe how they link CI with decision-making. The checklist was a useful follow-up that gathered details on decision-making tasks. The probing in this area follows through on the work of Campbell (2004), who focused on how CI activities involve turning CI knowledge into action that has utility for any firm. The checklist should provide information on the range of techniques that are employed to support decision making, thus offering preliminary insight into CI impact.

Lens 2: Organisational Structure supporting CI Activities and CI Analyst Role

Within the semi-structured approach, it was anticipated that the researcher could explore the support structure for CI in firms. It is expected that that such structures would vary – on the one hand, by a variation between explicit or implicit forms of support. Nonaka (1994) identified that implicit approaches are characterised by being more informal, while Liu, Raahemi and Benyoucef (2011) identified that explicit

approaches are characterised by organisational rules, models for data analysis and formal collaboration. Miller (2008), highlighted how implicit and explicit knowledge are communicated differently and that effectiveness requires both. Implicit knowledge (Nonaka 1994) may be evident in showing more ad hoc elements. The interview probing sought to examine these aspects – the level of structured communication, the evidence for flexibility and ad hoc approaches and the nature of feedback.

On the other hand, it was expected that CI activity in each firm might show some difference in degree of operational or strategic focus that the CI analysts would engage in. Larson (1992) identified indications of operational activities and this is relevant when considering whether analyst roles are operational or strategic in focus. In taking Ketchen *et al.*'s (2004) emphasis on whether CI activities relate to strategic questions (e.g. intelligence that is specific to entering a new market), the interview questions address this at different levels, as can be seen in Table 4.4 and 4.5 below. McIntosh *et al.* (2011), identified that systems should fit with CI analyst roles, and be adaptable to different user needs and the evidence for this adaptability was explored with respondents. In gaining an understanding of the firm adoption of explicit or implicit structures to support CI and in identifying the variation in whether analysts might adopt a strategic or operational role – both were expected to give insight into the organisational side of CI activity.

Lens 3: Link between CI Processes and Decision-Making

In addressing the third lens of analysis, the semi-structured interview enabled the researcher to encourage respondents to self-evaluate their own CI processes. This was, in part, achieved by asking respondents to indicate those areas of their CI processes (perhaps elements within the Integrative Framework of CI Activities) that were perceived to be effective and areas that were perceived to be less effective.

In addressing Objective 3B, the nature of the analysis toolkit in use in each firm was discussed in some detail with the respondents in the interviews. In identifying which *analysis tools are used*, the reported analysis tools are classified according to the theory

review into *predictive*, *evocative*, and *priority setting* analyses. This classification is relevant, as it reveals how data for decision support are prepared.

In considering 3A, the quality of CI processes is shown in perceptions of effectiveness and of sophistication. Information about both effectiveness and sophistication are primarily drawn from analyst evaluations. Perceived effectiveness was also considered from analyst experience of the link between CI activities and the strategy processes, the CI communication approaches and the CI input to decision preparation. For instance, the checklist gathered analyst self-evaluation of their information systems – in terms of appropriateness and timely achievement of tasks – this echoes the criteria noted by Hutzschenreuter and Kleindienst (2006), who underlined the importance of effective tools to effective strategy process. The checklist data were quite relevant, as they offered some specific data on certain indicators- that reflected the impact of CI analyses on competitive behaviour. Yap and Rashid (2011) identified that CI activities link to firm performance, which is expected for the Swiss telecoms in this study- and this was pursued in the interviews, where analysts were asked to rate their own firms on degree of impact. One aspect was the link between CI activities and strategic planning. For CI process intelligence, Staskeviciute and Ciutiene (2008) emphasised the importance of integration of organisational processes (CI actions) into the planning cycle. This was pursued in the discussions with analysts of their inputs into decision-making.

From the large-scale Swiss telecom firms, Swisscom was chosen as the exemplar firm for the second stage of the scenario analysis – where data points were taken in order to define a time series model, which could not be applied to the remaining firms as they were rather new in the market providing too few data points.

In assessing the development of the market and the telecom firms, a follow up interview was conducted at a later stage with the strategic analyst of Swisscom. The purpose of the follow up interview was to understand the degree to which, in how far the CI processes in the firms have developed in adapting to market changes.

In seeking to address Objective 3B, some indicators emerged from secondary data. Tsai, Kue-Hsien and Chen (2011) analysed competitive rivalry for firms of the same industry

with evidence of impact on market share; secondary data was gathered for the Swiss telecoms firms. This was true when addressing Objective 3B. In addressing Objective 3B, the key data did not come from the interview, but came from the scenario analysis, explained in detail in Section 4.6.4 above. In seeking to develop a scenario analysis for the sector, it was not possible to get adequate data on performance from the Swiss telecom firms themselves, as their analysis methodologies were quite basic - therefore other sources were sought. Goodwin (2012) recommended using secondary data if the purpose fits with those of the research, which is the case in this PhD study, when the researcher was trying to use a scenario analysis for predictive purposes at sector level. The secondary data analysis that was the basis used for the scenario analysis thus offered a broader perspective of the market context. An analysis with predictive purposes, based on the scenario analysis enabled clear insights into the probable future development of the Swiss telecom market².

4.7.3 How Checklist Items Matched prior literature

While Section 4.7.1 has explained how the interview dimensions matched with prior literature and how the three key lenses of analysis underpinned the key foci in the interviews, the findings in the study depended also on the checklist and on secondary data. As explained in Section 4.6.2 a checklist was used to provide information about the CI process and to balance the interview approach. The checklist as provided in Table 4.4 was given to the interviewees directly after the interview and is included in the interview analysis to get valid results (Krippendorff 2013). Table 4.4 additionally shows how the selected checklist questions match prior literature and insight sought by researcher.

² A follow up interview and comparison with actual data will show in how far the identified analysis methods apply for future use.

Table 4.4: Overview Checklist questions, Key sources and Insight sought

Question	Key Sources	Insight sought by researcher
Issue: analyst approach and organisation		
<p><i>How many CI analysts does your firm employ?</i></p> <ul style="list-style-type: none"> • Full time CI analysts • Part time CI analysts • Full time equivalent CI analysts 	<p>McIntosh <i>et al.</i> 2011</p>	<p>Number of analysts as indication of importance of CI process for the firm</p>
<p><i>Which approach do CI analysts mainly use to process competitor information?</i></p> <ul style="list-style-type: none"> • Process approach • Query based approach • Ad hoc approach 	<p>Staskeviciute and Ciutiene 2008</p> <p>Miller 2008</p>	<p>Respondents view of process intelligence</p> <p>Emphasis on explicit or implicit approaches</p>
<p><i>To which levels do CI analysts communicate intelligence?</i></p> <ul style="list-style-type: none"> • Board of directors • Marketing managers • Functional managers • Line managers 	<p>Aktouf 2008</p> <p>Rulke 2000</p>	<p>Respondents view on communicating analyses</p> <p>Respondents view on networks</p>
<p><i>In which department(s) are your CI analysts employed?</i></p>	<p>Mulcaster 2009</p> <p>Britton <i>et al.</i> 1997</p> <p>McIntosh <i>et al.</i> 2011</p>	<p>Importance of CI for the firm</p> <p>Organisation of CI teams in the firm as de-centralised – centralised</p> <p>How CI team is built up</p>
Issue: information systems		
<p><i>Which systems are employed in your firm to process information?</i></p> <ul style="list-style-type: none"> • Competitor information system • Management information system • Mathematical modelling system • Knowledge management system • Decision support system 	<p>Arman and Foden 2010</p>	<p>Respondent’s view of technology intelligence toolset</p>

Question	Key Sources	Insight sought by researcher
<i>If the introductory description does not fit the systems of your firm, which other systems do you use and how do you call them?</i>	Common understanding of system description	
<i>Which of your systems requires training before use?</i> <ul style="list-style-type: none"> • Software training • Analysis training 	Association for Strategic Planning 2014	Incorporate learning to promote common understanding of system use and analyses for team development
<i>Which issues do you process and if applicable which systems do you use?</i> <ul style="list-style-type: none"> • Monitoring competitors • Monitoring environment • Data Testing and predicting • Analysis procedures • Managing internal information 	Evans 2012	View of information systems applied for data gathering and analysis
<i>Please indicate which stages of decision-making your systems support?</i> <ul style="list-style-type: none"> • Set strategic objective • Strategic analysis • Strategy formulation • Implementation and control 	Spetzler <i>et al.</i> 2004	Respondent's view of resources applicable in supporting decision-making
Issue: analysis tools		
<i>Please identify, which analysis techniques you use in which system.</i> <ul style="list-style-type: none"> • SWOT • Five forces model (Porter) 	Porter 1998; Aktouf 2008	Respondent's view of importance of analysis techniques
<i>Please identify, which decision support techniques you use to provide recommendations for decision-making and in which system(s) this occurs.</i> <ul style="list-style-type: none"> • Set priorities • Weight alternatives • Evaluate preconditions 	McIntosh <i>et al.</i> 2011	Respondent's view of importance of decision support techniques and applicable tools

Question	Key Sources	Insight sought by researcher
<p><i>How much do recommendations influence decision-making?</i></p> <ul style="list-style-type: none"> • Set strategic objective • Strategic analysis • Strategy formulation • Implementation and control <p>Scale: very much, somewhat, very little, not at all, I do not know</p>	Mulcaster 2009	Respondent's view of CI as an important component for decision making in firms
<p><i>Please give an example of an action you take as a result of decision support output?</i></p>	Ketchen <i>et al.</i> 2004	Respondent's view on how to act on market changes from competitive pressure
Issue: Information systems		
<p><i>From your view, how technically sophisticated are your systems taken together?</i></p> <ul style="list-style-type: none"> • Processing Data • Analysing information • Supporting decision-making <p>Scale: very much, somewhat, very little, not at all, I do not know</p>	O'Brien 2011	Respondent's view of information system sophistication in supporting CI activities
<p><i>From your view, how effective in terms of appropriateness and timely achievement of tasks are your systems taken together</i></p> <ul style="list-style-type: none"> • Processing Data • Analysing information • Supporting decision-making <p>Scale: very significantly, a lot, somewhat, very little, not at all, I do not know</p>	Hutzschenreuter and Kleindienst 2006	Respondent's view of effectiveness of systems in supporting CI activities
Issue: identification of indicators for data gathering		
<p><i>How many new competitors did you intensively monitor during the last 3 years?</i></p> <ul style="list-style-type: none"> • Number of dangerous competitors 	Gnyawali and Madhavan 2001	Respondent's view of rivals that possibly provoke changes

Question	Key Sources	Insight sought by researcher
<p><i>To what extent do the following issues impact your firms' growth in terms of turnover, profit, or sales revenue?</i></p> <ul style="list-style-type: none"> • Existing competitors • New dangerous competitors • Competitors' new patents • Competitors' new product launches • Own new patents • Own new product launches 	<p>Liu and Song 2007</p> <p>Yap and Rashid 2011</p>	<p>Respondent's understanding of which indicators possibly relate to firm performance</p> <p>Indicators of the market can be seen as a related to firm performance</p>
<p><i>Please give an example how you act if an issues impacts your firms' growth?</i></p> <ul style="list-style-type: none"> • A dangerous competitor enters the market • A competitor gets a new Patent • A competitor launches a new Product and takes market share 	<p>Tsai <i>et al.</i> 2011</p>	<p>Respondent's view on how to best react on market changes</p>
<p><i>How quickly do you take these actions (as asked in question before)?</i></p> <ul style="list-style-type: none"> • New dangerous Competitor • Competitors' new Patents • Competitors' new Product / Service launches 	<p>Chen 1996</p>	<p>Respondent's view on urgency to react on market changes</p>
<p><i>How many Products / Services, and Patents does your firm and your main competitor hold and bring new to market?</i></p> <ul style="list-style-type: none"> • Number of own patents • Number of own product / service launches • Number of competitors' patents • Number of competitors' product launches <p>Time scale: Total before 2009, new since 2009, planned for 2010/2011, I do not know</p>	<p>Mullekom and Vennix 2004</p>	<p>Respondent's view on indicators that possibly cause market changes (monitoring and scenario analysis)</p>
<p><i>What was the turnover of your firm in 2009?</i></p>	<p>De Man <i>et al.</i> 2009</p>	<p>Considered as part of the scenario building, a variable to measure success</p>
<p><i>Please give your overall remarks about using Competitor Intelligence for decision-making.</i></p>		

The checklist focus on primarily on effectiveness. One way of examining the effectiveness and sophistication of the CI process would be to try to compare the patterns noted with a best practice approach. Ideas on best practice in CI have been well-developed in the literature, as noted in Table 4.5 below. This was considered. Table 4.5 notes how, in relation to each research objective, past studies which brought in elements of best CI practice are considered when assessing the relative effectiveness of the CI processes across firms. Additionally, as explained in Section 3.4, quality is the degree to which a set of inherent characteristics fulfils requirements (ISO 2008). The interview findings did offer some insight into how a CI process can be assessed but this was regarded as potentially inadequate due to the subjective view of the researcher. Even though this was supported by previous research (i.e. Wright, Eid and Fleisher 2009) by defining roles for each level, best practice is not directly applicable to the CI process, because the roles that were reported in the findings did not match the ones identified in previous research (see Sections 5.5.1 and 7.3.4.1).

Table 4.5: Overview Interview questions, and Key sources of CI Practice

Research Objective	Illustrative Interview Question	Key Sources
Operational Lens 1. To identify the nature and scope of CI activities (operational elements) in the four case firms.	Please describe how your firm processes competitor information.	Krizan 1999; Evans 2012; McIntosh <i>et al.</i> 2011; Fleisher and Bensoussan 2003, 2007; Kruschwitz and Shockley 2010; Michaeli 2006; Tsai <i>et al.</i> 2011
	Please describe how your firm uses their information systems.	Britton <i>et al.</i> 1997; McIntosh <i>et al.</i> 2011; Dong <i>et al.</i> 2012; Michaeli 2006; Kruschwitz and Shockley 2010; Wagner <i>et al.</i> 2006; Evans 2012
Organisational Lens 2. To examine how organisational structures shape the CI processes in the four case firms	Strategic – operational attitude towards CI issues Checklist: Job title and department	Ketchen <i>et al.</i> 2004; Larson 1992
	Please describe how your firm communicates subsequent information. Describe, which people and systems are involved. Describe which stations information is taking.	Johnson and Lederer 2005; Rulke 2000
	Overall: Please describe how your firm designs and realises CI information flows.	McIntosh <i>et al.</i> 2011; Dong <i>et al.</i> 2012; Michaeli 2006; Kruschwitz and Shockley 2010; Evans 2012
Strategic Lens 3A. To evaluate analysis approaches in the four case firms	What system for your firm links competitor information with its strategic decision-making process?	Peyrot <i>et al.</i> 2002; McIntosh <i>et al.</i> 2011; Michaeli 2006; Campbell 2004
	Assess the CI development of your firm since you work here.	O’Brien 2011; Michaeli 2006; Hutzschenreuter and Kleindienst 2006; Trim and Lee 2007
	What type of information serves as an early warning indicator?	Liu and Song 2007; Yap and Rashid 2011; Herring 1999; Mullekom and Vennix 2004
Strategic Lens 3B. To identify how analyses potentially support management decision making	Additional question: Can you describe your analytic approach / toolkit?	Rouibah and Ould-ali 2002

Past research had identified it as important to show how organisational variation shape CI processes, but dealt with this in a limited way (Trumbach and Elofson 2007; Rothberg and Erickson 2013; Wheaton 2012). Specifically, there was no indication of best practice in this area, which could be used as reference. Considering effectiveness and sophistication, past research has identified elements of CI process effectiveness (Peyrot *et al.* 2002; McIntosh *et al.* 2011), but has given indications of its overall effectiveness in a limited way (Michaeli 2006). The given indications were considered in this research, specifically when discussing effectiveness of analyses. Another way of evaluating CI practice is to identify criteria that are important for an effective process, and to consider criteria that relate to specific elements within the Integrative Framework of CI Activities (Figure 3.4). Thus criteria used in past studies and noted in Section 3.4 above are regarded as a good barometer for assessing CI process effectiveness. A brief overview of relevant criteria is noted in Table 4.6 below.

Table 4.6: Potential areas for overall Effectiveness of CI Process

	Issues	Criteria from past studies	Author
Process and Structure	Plan and focus	Process plan, forward-looking approaches	Krizan 1999; Evans 2012
	Gather and analyse	Relevant, correct, and current approaches and tools	McIntosh <i>et al.</i> 2011
	Decide and communicate	Relevant and sophisticated analysis tools, include strategy, current, qualitative information, and context	O'Brien 2011
	Information systems, Organisation	Develop systems, adopt CI team structure according to development stage of CI process	Wagner <i>et al.</i> 2006
Analysis	Detect indicators	Detect and interpret relevant market signals	Rouibah and Ould-ali 2002
	Analyse indicators	Variety of views on topics (focus and holistic), and analyses (predictive, evocative, priority setting)	Neugarten 2006
Effective Process	Perceived effectiveness of processes	Flexible strategy process, effective communication, systems and processes perceived as effective	Johnson and Lederer 2005
	Variation of sophistication	Emphasise relational channels, systems and processes perceived as sophisticated	Rulke 2000
Effective Analyses	Decision support techniques	Support decision making with relevant analyses to improve firm performance	Peyrot <i>et al.</i> 2002; Yap and Rashid 2011
	CI and management	Management supports CI activities and extents organisational resources, CI deals with strategic issues	McIntosh <i>et al.</i> 2011
	Market scenario	CI process supports the relevant market scenario	Maack 2001

Both the interview and checklist findings, and the market context findings (from the applied scenario analysis) are finally assessed for effectiveness of CI processes, taking into account of best practice ideas and criteria that have been noted as important by Michaeli (2008) and BABOK (2011) (see Section 7.4).

The aim in this research was to examine evidence in the case data of how some of the issues shown in Table 4.6 have been addressed and how they may have contributed to perceived effectiveness. Elements are considered for each firm, based on analyst perceptions and checklist data (see Section 5.4 and Appendix II). The firm approach to supporting the CI process is examined by investigating the team structure – looking at issues such as centralisation and the evidence for explicit and implicit approaches in the firms (see Section 5.5.4). Finally, sophistication of processes and systems (see Section 5.4 and Appendix VIII) and potential integration between CI and other systems (see Section 5.5.3), are examined, as the overall evidence of a holistic pattern in CI activities. Table 4.7 shows relevant interview and checklist questions for the above areas of focus.

Table 4.7: Considering Effectiveness, Sophistication and Potential Integrative Capacity in CI Activities - Interview and Self-Assessment Checklist

	Issues	Interview Question	Self-Assessment Checklist
Process and Structure	Plan and focus Gather and analyse	Please describe how your firm processes competitor information	Which approach do CI analysts mainly use to process competitor information?
	Decide and communicate	Please describe how your firm communicates subsequent information. Describe, which people and systems are involved. Describe which stations information is taking.	To which levels do CI analysts communicate intelligence?
	Information systems, Organisation	Please describe how your firm uses their information systems.	Which systems are employed in your firm to process information? Which issues do you process and if applicable which systems do you use?
Analysis	Detect indicators	What type of information serves as an early warning indicator?	Please give an example how you act if an issues impacts your firms' growth?
	Analyse indicators	Additional question: Please describe your analytic approach / toolkit.	Please identify, which analysis techniques you use in which system.
Effective Process	Perceived effectiveness and sophistication of CI process	What system for your firm links competitor information with its strategic decision-making process?	From your view, how effective in terms of appropriateness and timely achievement of tasks are your systems taken together
		Assess the CI development of your firm since you work here.	From your view, how technically sophisticated are your systems taken together?
Effective Analyses	CI and management	Overall: Please describe how your firm designs and realises CI information flows.	How much do recommendations influence decision-making?
	Market scenario	Assess the CI development of your firm since you work here	Please give your overall remarks about using CI for decision-making.

4.8 Sample Selection of Respondents and Administration of Interviews

The sampling approach was a purposive expert sampling / expert elicitation (Jupp 2006). This enabled the researcher to identify the respondents who represented the main expertise in the firm for CI. At the time of the interviews, analysts were employed in

Swisscom's six departments and in the group strategy department. The main analyst on group strategy and an analyst of the department of residential customers were identified as representative respondents. The group strategy department focusses on the firm's strategy and the market, therefore it is of main relevance for doing CI. The department of residential customers is the largest of Swisscom's departments, therefore of main importance for the firm. Sunrise had a small team of CI analysts and the team leader was identified as the most representative respondent. Orange showed just one analyst responsible for doing CI. For Cablecom a first interview was conducted with an analyst appointed for an operational analyst role, the second interview was conducted with the analyst that was appointed for the strategic function in Cablecom and the assistant of the CEO to give a management perspective.

The total number of analysts that could potentially be interviewed in 2010 - the time of the interviews – is indicated next for each of the four firms.

- Swisscom: two FTE (Full Time Equivalent) and 5 PTE (Part Time Equivalent) analysts group strategy department, 5 part-time analysts in the other departments
- Sunrise: one FTE, two PTE
- Orange: one PTE
- Cablecom: Operational role: four FTE, Strategic role: 15 FTE

The first interview took place with the strategic analyst of Swisscom, who was mainly responsible for CI analyses. He identified who was the main responsible analysts of Swisscom in 2010 and the analyst responsible in Sunrise. These analysts were then approached. For Orange the researcher approached a manager responsible for Orange in the UK. He then identified whom to approach in Switzerland. For Cablecom, the marketing and media spokesperson was approached to identify the responsible analysts. The first interview with Cablecom took place with an analyst that was responsible for operational analyses of the market. He then identified the analyst appointed for the strategic function of the firm, and the assistant of the CEO to give a management perspective of CI.

The first approach towards Swisscom resulted in an interview with an analyst that knew Swisscom from his work in the past. A necessary second interview was then done. The first approach towards Orange resulted in a shift of analysts, as the manager in UK was

not responsible for Switzerland. For Cablecom, the first respondent – in the operational role – was not responsible for doing strategic CI, which resulted in a second interview. Table 4.8 offers some background data on the analysts who were interviewed; identifying their roles in the firm and their level of experience. Some respondents could be followed up through their LinkedIn profiles, which showed if they shifted their positions, their background and experience. LinkedIn allowed short communication with them in order to learn about changes in the firms and their positions. It was specifically important to see, who still was appointed in his or her role as analyst and who changed its position – within or to another firm. It was notably that Sunrise's analyst was later appointed as analyst in Swisscom, and Cablecom's operational analyst was appointed as strategic analyst in Swisscom, too. Table 4.8 shows the interview and checklist respondents, their role in the company and their experience in doing CI.

Table 4.8: Interview Respondents

Company	Respondent role in company	Experience of Respondents
Former Swisscom Analyst 1	Group Strategy & Steering for Swisscom Group. Responsibilities: Manger Competitive Analysis and Manager Strategic Research, Business planning, benchmarking, competitive analysis	Worked in Telecom industry since 1980s (Sunrise former DiAx, and others) Worked for Swisscom from 2000 to 2005. From 2006 to 2009 he worked for Sunrise as Senior Market Analyst. Is in his 60s.
Swisscom 2010 Analyst 2	Research Analyst residential customer department. Responsibilities: Research Analyst	Works since 2008 for Swisscom first as Controller, then as Research Analyst. He is in his 30s.
Swisscom 2010 Analyst 3	Senior Market Research Manager strategy department. Responsibilities: Strategy and Business Development, Strategic analysis, market and competitive intelligence	Research Analyst Group Strategy since February 2008. Senior Market Research Manager for Swisscom since October 2001. Is in his 40s.
Sunrise Analyst 4	Manager Market Intelligence. Responsibilities: consumer, market and competitor insight, market research	Since 2013 Strategic Planner at Swisscom Switzerland Inc. Manager Market Intelligence Sunrise from 2008 to 2012, before worked for Nokia and Siemens. Is in her 40s.
Orange Analyst 5	Senior Manager Strategic Projects. Responsibilities: market research and market intelligence, consumer (B2C) section, strategic projects	From 1999 to 2007 he first worked in Tourism then Transportation industry. Since 2007 works for Orange, first in Market Research, later as Senior Manager Strategic Projects. Since 2011 works for Orange as Manager Customer Value. Is in his 40s.
Cablecom Operational Analyst 6	Head of Commercial Management. Responsibilities: operative such as budget plans	Since 2011 works for Swisscom as Senior Manager Product Portfolio, was Head of Commercial Management for Cablecom from 2009 to 2011, from 2008 Head of Product Management. From 1998 to 2004 he worked for Swisscom with focus on Knowledge Management, Innovation Management and Marketing. Is in his 50s.
Cablecom Strategic Analyst 7	Senior Strategy Manager, Responsibilities: rollout, negotiations with MVNO, Marketing, research (finance, product, sales), and Marketing Strategy	Worked for Cablecom from 2006 to 2011[as Senior Strategy Manager and Acquisition Marketing Broadband Internet]. Experienced in Consulting, and Product Management. Is in his 40s.
Cablecom Executive Assistant Analyst 8	Executive Assistant to the CEO/MD. Responsibilities: Assists CEO, coordination, planning, preparation	Worked for Cablecom since 2010. Since 2011 he is head of a profit centre at Cablecom. Is in his 20s.

4.8.1 Piloting of Research Instrument

The interview questions and the checklist were pre-tested and refined first from one CI expert and second from two telecom experts. Aim of the pilot test was to reduce errors (Trochim 2007). The sequence of the pre-test was important as the CI expert gave more general comments, while the telecom expert could identify, in how far a question applied to the telecoms or not.

For the interview questions the CI expert asked to make sure that the CI process is already running as otherwise the questions would assume a running CI process without prove. For the checklist one CI analyst asked to explain the terms. This was done by handing out an overview about the terms at the beginning of each interview to the analysts. She further asked to clarify questions concerning 'internal conditions'. As a result, these questions were omitted. The telecom analysts agreed with the interview questions. They received the refined checklist. They asked to give examples of how to act if a competitor impacts growth. Instead of asking in how far this would impact profit just positive, negative or no impacts are asked. Also they asked to differentiate between new competitors and existing ones.

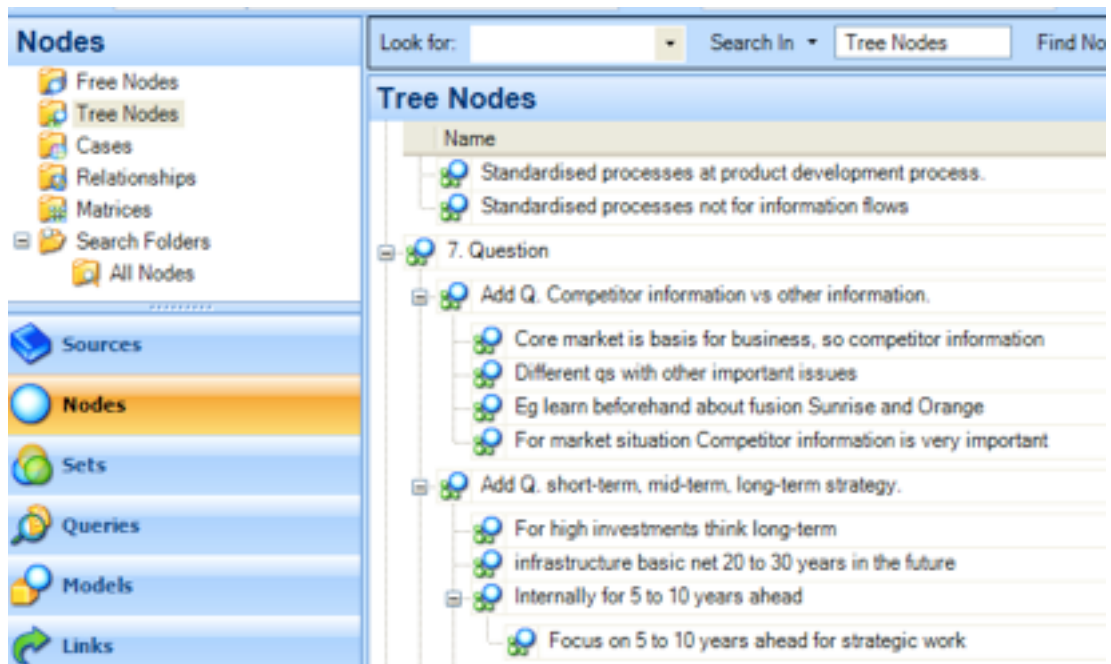
4.8.2 Administration of Interviews

The researcher met the CI analysts of the four large-scale Swiss telecom firms in meeting rooms on site. The environment was not influencing the interview. Later pair interviews were conducted with two CI analysts for Swisscom and Cablecom. For the pair interviews at Swisscom and Cablecom each analyst answered the questions and supplemented ideas of the other. The pair interviewees encouraged good discussion, a feature of pair interviews, as noted by Porcellato, Dughill and Springett (2002) small and homogenous pair interviews of children help to maintain a high level of interest and participation. If that applies for children, it applies for experts, too. On occasions the responses needed clarification or expansion, such that the researcher provided additional questions to encourage the discussion. This led to more specific and complete answers. All interviews were conducted in 2010. All interviewees agreed with non-disclosure of confidential issues and the interview output could be used for the thesis. The researcher contributed to a positive interview atmosphere.

4.9 Data Analysis of Interview Data

The interviews were analysed following content analysis. One aspect of content analysis is the data reduction technique (Stemler 2001). The interview transcripts were coded using NVivo version 8. This enabled the researcher to structure the data, to categorise the data and get an initial overview of relevant themes. Text searches on the original transcripts enabled grouping and categorisation of data, regarded as the first phase of analysis for qualitative data (Saunders, Lewis and Thornhill 2012). An example of coding with NVivo is depicted in Figure 4.2 below.

Figure 4.2: Coding with NVivo: Example of Swisscom's Analysts



Initially the Interviews were coded following the structure of the interview questions. The initial coding structure and a coding example are shown in Appendix III. The initial coding gave an overview. When studying the results, it became obvious that a preliminary coding was needed to follow the CI activity structure. Therefore, a preliminary coding tree for the interviews was used as shown in Appendix IV. Although NVivo was helpful in this initial stage, it proved less than useful at the following stage, when seeking to move beyond categorisation of the data (Spiggle 1994). As the researcher considered the data categories in the light of the theoretical constructs in the Integrative Framework of CI Activities (lens 1), and with the perspective in seeking to

understand the support structure behind CI processes (lens 2), initial categories were revised and some had to be ignored as they did not capture well the strong link between factual elements of CI activity and the interpretation of contextual aspects that were influencing the CI process implementation in firms. A second stage of axial coding involved manual grouping of initial categories of data that drew out more of the interrelationships between data categories and brought the contextual background to the fore (following Strauss and Corbin 1998; Onwuegbuzie *et al.* 2009). From this key themes emerged.

As the data analysis of the interviews progressed, the process followed some elements of the hermeneutic spiral (Mayring 2014), as key themes evolved from both theory and data. Feagin *et al.* (1991) found that the grounding of field observation in a natural setting studied at close hand and the interrogation of the concepts in the light of that setting allows a more holistic understanding to emerge. From theoretical consideration of the data, the evidence for each CI Management element were considered, patterns confirmed and contradictions noted. This approach of probing within the interview data for accordance with theoretically identified constructs was a primary aspect of the initial content analysis (Easterby-Smith *et al.* 2012). Following this initial open and axial coding process, cross case analyses were undertaken, which allowed the researcher to compare CI process patterns and CI structural support patterns that had emerged in the data across each firm, following a process outlined by Barnes *et al.* (2003). Consistent and divergent patterns were noted and became part of the findings chapters reported in Sections 5.3.

In seeking to address the third lens of analysis, the focus on the link between CI process and decision-making (Research Objective 3A and 3B), the analysis of the interview data was supplemented with the analysis of the checklist data, as shown in Table 4.4 above. As outlined above, the self-assessment checklist was completed by each analyst, offering the opportunity for self-assessment of critical aspects of their CI processes. When being completed, the researcher was present in case of any clarification questions from informants. The findings from the checklists (in the form of rating scale data) were analysed descriptively using SPSS (setting out the frequencies and means scores). With a purposive sample, there was no intention to seek statistical significance. The patterns

to emerge are reported and integrated with the insights from the interviews in order to bring a more evaluative perspective on the implementation of CI in the firms. We can see from Appendix VIII how the rating scales offered a good summary of analyst self-evaluation. This was particularly helpful when seeking to offer insights in the effectiveness and sophistication of the CI processes as observed in the study across all four firms. A thematic map that captures the clustered themes and their interrelationships in the findings is shown in Appendix V.

4.9.1 Data Analysis for Market Scenario

The secondary data were collected for new entrants from Creditreform (2010), for patents from Swiss Patent Office (Patents 2010), Human resources in S+T in Switzerland from SAKE (2010a; 2010b), for ICT in Switzerland in from BFS (2010). Firm data were collected from the companies' webpages, which were available from the beginning of Sunrise, Orange, and Cablecom foundations. To get more annual profit data from Swisscom, which existed also prior to the liberalisation of the Swiss telecom market, data were searched from the Swiss postal archives. For the data analysis first linear trends were calculated by applying linear regression. These results served to identify the most relevant scenario and indicator. The indicator (new entrants) was calculated with the profit data of Swisscom using a Vector Autoregressive time series model lag 3. Prof. Dr. Lutz Dümbgen confirmed the data analysis steps. He is actually professor for statistics at the University of Bern (Switzerland). To calculate the analysis procedures, the Software R was used (R software 2015) version 2010 for Macintosh. Each analysis step is explained and the relevant formulas shown in the findings chapter for quantitative analysis (see Chapter 6, specifically Section 6.4).

There is no independently available evidence in this case for the interviews – it is all experiential and contextual.

4.9.2 Reliability and Validity

Yin (2009) applied the concepts of construct validity, external and internal validity and reliability as criteria of accuracy of analysis in qualitative research. Lincoln and Guba (1985) denoted that the concepts of validity and reliability should not be applied to qualitative research, but credibility and transferability, dependability and confirmability

instead, which denotes the same concepts but emphasises the qualitative nature of the data. Construct validity evaluates consistency within the research process. This was achieved in this research through the complimentary lenses (see Figure 4.1). External validity evaluates how to apply the findings of the research to other cases. Farquhar (2012) calls it ‘generalizability’ and that it is not possible to show statistical evidence for it in case studies. The results seek to show patterns in CI, which firms with similar characteristics can benefit from. Internal validity evaluates evidence of relatedness between constructs. Reliability verifies that the findings can be replicated (Yin 2009). The analysis process is shown and explained (see Chapter 5), and the data sources can be seen from Appendices I, II and X. Data gain reliability when generated with precaution and the same meaning for everybody using them (Krippendorff 2013). Both validity and reliability are achieved by employing different instruments to generate the data with precaution to interview settings, wording, and the choice of interviewees. Krippendorff (2013) recognised that case studies tend to rely on small samples of data and that it is common to apply content analysis methods, even though its full methodological potential is not exploited, which is the case in this PhD study. He criticised a lack of theoretical background but this is carefully considered in this study. Analytical constructs are used as basis for interpretation of data, which is seen by Krippendorff (2013) as a form of logical inference:

“An analytical construct accounts for what the content analyst knows, suspects, or assumes about the context of the text, and it operationalizes that presumption procedurally in order to produce inferences from that text.”

Farquhar (2012) noted that case studies should show relatedness between concepts (internal validity). In this PhD study the Integrative Framework of CI Activities represents an example of a solid analytical construct that enabled evidence data to be analysed in a valid way and to be interpreted for the first lens of analysis of the semi-structured interview data.

Teddlie and Tashakkori (2009) and Denscombe (2007) identified three characteristics of a mixed method approach, noting the value of triangulation of data:

*“Use of qualitative **and** quantitative approaches within a single research project; explicit focus on the link between approaches (**triangulation**); emphasis on practical approaches to research problems (**pragmatism**).”*

In a qualitative study some parts of research are emergent (Onwuegbuzie and Combs 2011). Emerging themes increase understanding (Onwuegbuzie, Dickinson, Leech and

Zoran 2009). In early stages of content analysis, emergent themes were collated and reduced through NVIVO categorisation. The data analysis strategy at the later stage was to analyse data by describing the interrelationship between individual and cross-case themes (Creswell 2007). This lends rigour to research (Sekaran 2002; Teddlie and Tashakkori 2009).

A deductive approach was taken towards the scenario analysis evaluating how firms adapted to change and in relation to the most probable scenario. Elo and Kyngäs (2007) claimed the selective use of data in the scenario approach as deductive, as those data that are selected for analysis, are only data that can correspond to the analysis scheme (Patton 2002). Table 4.9 gives an overview of the overall data analysis approach, and this identifies how the study switches between an inductive and a deductive approach (which is consistent with a pragmatist research philosophy).

Table 4.9: Data Analysis Approach

Analysis approach	Analysis steps
Inductive: Nature of CI activities	<ul style="list-style-type: none"> • Thematic coding of semi-structured interviews transcripts and checklist data using established content analysis principles • Gathering objective documents in form of firm report to crosscheck the presence of themes with CI actions taken
With actual Inductive: Understanding of organisational support and structure for CI	<ul style="list-style-type: none"> • Evidence for operational and strategic roles of analyst in interview data and in self-assessment • Noting of organisational characteristics shaping the CI process in interview data
Deductive: Assessing CI process effectiveness Identifying outcomes of predictive analysis	<ul style="list-style-type: none"> • Identifying level of effectiveness and sophistication in CI activities based on ratings (self-reported) and on comparison with key criteria in past studies – logical inference • Establishing factual information on nature of CI Analyses in use and considering level of static/predictive scope of such analysis • Quantitative time series and scenario planning methods adopted leading to specific outcomes. Considering performance of one firm in light of outcomes

4.10 Summary of Chapter

In this chapter, the methodology has been set out. The research aims and objectives are outlined initially, followed by a justification of the research philosophy. Both an interpretivist approach using qualitative data analysis (Chen and Hirschheim 2006) and

a postpositivist approach using quantitative data analysis (Cresswell 2007) are drawn upon, thus leading to a pragmatist philosophy and a mixed methods approach in data collection (Tashakkori and Teddlie 1998). A case study method is outlined as the main research strategy and the data collection process involving semi-structured interviews, with additional checklist data from the Swiss telecom analysts used to support this. In addition, the approach taken to the market context analysis using scenario analysis is identified. The data analysis (Onwuegbuzie, Dickinson, Leech and Zoran 2009) will involve a content analysis of interview and other data.

The next two chapters (Chapters 5 and 6) report on the research findings.

Chapter 5: Research Findings from Case Analysis of CI Processes

This chapter initially offers an overview of the interview process and of the background of respondents in **Section 5.1** and explains the focus of this chapter – the firm perspective in **Section 5.2**. Thereafter, the chapter consists of four sections – 5.3 to 5.6, - each taking a different perspective on the CI process as observed across each firm. The chapter is structured along the three lenses of analysis (see Figure 3.4). Sections 5.3 and 5.4 cover the operational lens. **Section 5.3** examines the nature of CI Activities at firm level (CI Management) while **Section 5.4** on CI Quality offers insight into the effectiveness of CI processes at firm level. For the organisational lens, **Section 5.5** considers the organisational structures to support CI, including the development of information systems (CI Organisation). Taking a broader view of the nature of CI development, CI approaches within firms are analysed in terms of implicit and explicit orientation, offering a more holistic view of the development of CI processes in each firm. **Section 5.6**, first examines CI Content – the forms and scope of CI analysis, and second considers the link between CI Analysis and Decision Making – CI Synthesis – covering the strategic lens. **Section 5.7** summarises the chapter.

5.1 Overview of Interviews undertaken and of Respondents

Across the four cases in this PhD study, there were different levels of staff involved in CI activities across firms. Cablecom appeared to have the greatest number of CI analysts. Cablecom's operational analyst (one of respondents) cited four full-time CI analysts from his own department, while the strategic analyst (also one of respondents) indicated a total of fifteen for the whole firm. In contrast, Swisscom had two full-time and five part-time CI analysts, spread across central and departmental roles. For Sunrise, there was one (central) team with one full-time and two part-time CI analysts. In contrast to Swisscom and to Sunrise, in the Orange case, there was just one centrally located CI analyst (the respondent) dealing with CI activities on a part-time basis. Interviews for all four firms were conducted at meeting rooms on-site at each firm, except the first interview at Swisscom, which was held at a meeting room provided by

the researcher. The second interview at Swisscom was held at their headquarters in Bern, involving a paired interview with Analyst 2 and 3.

Table 5.1: Respondent Characteristics

Company	Respondent role in company
Swisscom Strategic Analyst 1	Group Strategy & Steering for Swisscom Group. Responsibilities: Manger Competitive Analysis and Manager Strategic Research, Business planning, benchmarking, competitive analysis
Swisscom 2010 Strategic Analyst 2	Responsibilities: Research Analyst within Residual customers' department. Responsibilities: Research Analyst
Swisscom 2010 Strategic Analyst 3	Senior Market Research Manager within Strategy Department Responsibilities: Strategy and Business Development, Strategic analysis, market and competitive intelligence
Sunrise Strategic Analyst 4	Manager Market Intelligence. Responsibilities: consumer, market and competitor insight, market research
Orange Strategic Analyst 5	Senior Manager Strategic Projects. Responsibilities: Market Research and Market intelligence, consumer (B2C) section, strategic projects
Cablecom 2010 Operational Analyst 6	Head of Commercial Management. Responsibilities: operative such as budget plans
Cablecom 2010 Strategic Analyst 7	Senior Strategy Manager, Responsibilities: rollout, negotiations with MVNO, Marketing, research (finance, product, sales), and Marketing Strategy
Cablecom 2010 Executive Assistant Analyst 8	Executive Assistant to the CEO/MD. Responsibilities: Assists CEO, coordination, planning, preparation

In addition to the interviews, each firm was asked to complete a checklist that set down the nature of their CI activities and offered a self-evaluation of those activities. After the Swisscom interviews, each respondent volunteered to comment on the checklist and this provided a second pilot test of the checklist. As a result, the checklist was slightly changed by allowing the interviewees to give their own examples about their view on how CI had an impact on market activities. A brief second meeting was then held with Analyst 2 and 3 to allow both respondents to complete the amended checklist. Subsequently, the checklist was issued to Analyst 1 for a second time and he completed it, based on the changed questions. The third interview was held at Sunrise's headquarters in Zurich in a meeting room; similarly, the fourth interview was held at the main headquarters of Orange in Lausanne. For the fifth interview at UPC-Cablecom Switzerland in Zurich, the respondent clarified that his CI role was mainly operational and volunteered to make contact with strategic CI analysts. As a consequence, a sixth interview, again a paired interview, was held at the main building of UPC-Cablecom

Switzerland in Zurich with a strategic CI analyst and the executive assistant. Each respondent completed the checklist after the interviews.

Overall, the analysts took part enthusiastically in all interviews, with one exception¹. Each interview was audio-recorded, the interviews were subsequently transcribed; following transcription, the respondents were asked to review the transcripts. This step provided clear and transparent data and helped eliminate possible misunderstandings. The interview data was then analysed using content analysis (Easterby-Smith *et al.* 2012; Stemler 2001). Open coding of transcripts was undertaken, where preliminary themes were identified within the data. These themes were then further analysed and categorised adopting both an open and axial coding approach (see Strauss and Corbin 1998; Onwuegbuzie *et al.* 2009) by first applying NVivo Version 9 (2012). The themes to emerge covered both the experience of respondents of specific elements of the CI Process in their day-to-day activities but also highlighted overarching patterns that identified how CI activities matched the strategic management process within the firms.

5.2 Focus on CI Activities taking 3 Lenses from a Firm Perspective

Once an initial level of analysis was undertaken and key patterns/themes in relation to data on CI Activities was gathered (open coding process, as noted by Strauss and Corbin 1998), the research questions that were associated with the theoretically identified CI Activities (shown in Table 5.2) were used as categories to represent the next level of analysis, involving some interrelating of the initial themes with the theoretically oriented areas within the Integrative CI Activities framework in Figure 3.4. This resulted in a set of transcript codes, which were then used as a basis for analysing the interview transcripts a second time. Comparison with past studies occurred during this stage of analysis, which enabled the researcher to gain significant insights into the CI Process of the four firms, through an iterative process of interpretation (Mayring 2014; Strauss and Corbin 1998). In Sections 5.3 to 5.6, findings are presented through

¹ During the interview, one analyst appeared in a hurry, keeping his phone on the table and came back and forth to make phone calls and answer the interview questions. He sometimes gave short answers, sometimes stayed mute. He left the meeting before he had completed the questionnaire. Even though he was asked many times to complete it later he never did. Some of his responses were followed up with the other Cablecom analysts.

focus on the core CI Activities (from Figure 3.4). This offers detailed understanding of CI as it occurs at the firm level.

Table 5.2: Focus of Interview Analysis

Activity	Research Question	Focus for Analysis
Section 5.3 CI Management Operational lens	How do large-scale Swiss telecom firms process CI and which analysis tools do they apply?	Which analysis tools are used and how they are used
Section 5.4 CI Quality Operational Lens	How <i>effective</i> do large-scale Swiss telecom firms use CI information and transform it into processed competitor intelligence?	How CI analysts perceive the effectiveness of information transformation
	How <i>sophisticated</i> do large-scale Swiss telecom firms perceive their CI information and competitor intelligence?	How CI analysts perceive the sophistication of information exchange
Section 5.5 CI Organisation Organisational Lens	Which information systems do large-scale Swiss telecom firms apply and how do they adapt their team structure?	Which information systems are used; how CI team is organised for information exchange
Section 5.6 CI Content and CI Synthesis Strategic Lens	Which <i>information</i> serves large-scale Swiss telecom firms to act on competitors?	Which information is gathered
	How is this information <i>analysed</i> ?	Which analysis tools are used
	How do CI analyses in large-scale Swiss telecom firms inform decision-making?	Interaction of CI and management for decision support

Table 5.2 above shows the CI Activities that are the focus of this section. Through the operational lens, tasks of CI in firms were analysed in Sections 5.3 and 5.4. Section 5.3 on CI Management focuses on the respondent experience of the CI process within their firm- planning, communication and involvement in decision-making. In section 5.4 on CI Quality seeks to draw out the *relative* effectiveness of the CI process, based both on analyst narratives and on their completion of the checklist. In the checklist that each respondent completed, they were asked to identify the effectiveness of their processes. Section 5.5 deals with the organisational lens. CI Organisation presents the respondent views of how their firms organised their CI teams, seeking to gain some idea of the relative importance the firm gives to CI. This section also focuses on the range of activities that centred on the use of information systems to support data transformation and storage. Finally, the strategic lens as analysed in Section 5.6 first looks at CI

Content, which specifically concentrates on the information gathering and analysis process that was in place and how that was experienced from the analyst perspectives. Second, by reporting on evidence of CI Synthesis, the analysis centres on the link between the CI process and management decisions, thus reporting on reported interaction of analysts with management. The influence of CI analysts on decision-making is discussed by looking at CI decision support.

5.3 Varied focus in CI Management across Firms – Operational Lens

This section reports on the elements of CI Management, in particular those elements of the CI Process that are highlighted as significant by respondents. This section first looks at how the analysts experience their CI Process as a whole and which information systems are being used for CI information analyses. The respondents explained what they considered most important for their CI Process. A strategic analyst at Swisscom outlined the experience of the CI Process, noting:

*“One should research focussed at the various concerning issues. My tasks contain about a 90% ad hoc queries [**focus on Swiss market**]. There are very few repetitive issues, which are framed into Newsletters.”* (Analyst 3, Swisscom, date of interview 14/04/2010)

“To observe the competitors is a small part, which can be enriched with other information we have from Swisscom as for example results from market research, secondary studies, and others.” (Analyst 2, Swisscom, date of interview 14/04/2010)

Respondents focused on analysis of the total market, and on detailed competitor analysis, as reported by the Sunrise analyst:

*“Sunrise processes competitor information in terms of **several strategic analyses**. On the one hand we compile information like financial results of their quarterly reports and also operational results which we track for every competitor we think, which is important for us, and then from this information we compare their results with our results... we **compile the total market information** in the firm an about the positioning of the main competitors in the market.”* (Analyst 4, Sunrise, date of interview 01/10/2010)

Here the respondent was eager to know the current competitor positioning. For Orange analyst, the core of CI is data gathering and analyses:

*“So there are two – lets say – stages of processing information: first is getting the information, which is **publicly** available or which you can buy **legally**, and the second stage is to get some insights and intelligence on it. That would be, lets say,*

the typical approach.” (Analyst 5, Orange, date of interview 20/10/2010)

Considering that the respondent was part time might explain the focus on legality, but other respondents also emphasised the public availability of data. The Orange analyst did not offer much detail on their role. Cablecom’s operational analyst focused his analyses directly on Swisscom’s performance, the main competitor for Cablecom’s main product offers (TV, Internet).

*“Cablecom uses all the information, which is available through the Internet, annual or quarterly reports from our competitors in Switzerland and combines this information with internal information to a quarterly competitor update with **market shares** and translate the market share, which is dated for the whole Switzerland into market shares related to [Swisscom’s] footprint because Swisscom has a footprint of about 50%.”* (Analyst 6, Cablecom, date of interview 10/11/2010)

This respondent dealt mainly with (repetitive) operational analyses, with a strong focus on market share (similar to Sunrise). The Cablecom strategic analyst was more detailed in his explanation of the CI Process.

*“We have a competitive **review process**, where we systematically gather all the information that becomes publicly available from competitors as Swisscom, and Orange. We gather this on a Swiss platform for the Swiss market. We put this information in a report or presentation form, and compare the different indicators from each competitor, like market share, churn, sales figures and other **financial** information, as much as becomes available, for our **reports**, quarterly or monthly.* (Analyst 7, Cablecom, date of interview 29/12/2010)

The strategic respondent mentioned a wide array of sources, from which he could deduce intelligence and he saw information sharing as a core part of CI activities.

Cablecom’s strategic analyst pointed to customer management monitoring:

*“We are doing more analysis of what our **customers** are perceiving, what customers are thinking about Cablecom, how processes work or don’t work for customers, for example waiting times in call-centres.”* And *“Three years ago [we introduced] a strategic function, which is in charge of monitoring [Cablecom’s] general direction.”* (Analyst 7, Cablecom, date of interview 29/12/2010)

What distinguished Cablecom was this strategic planning aspect within their analysis.

5.3.1 Ad hoc and structured approaches in Planning

In CI Planning, both ad hoc approaches and structured approaches were evident.

*“There is **no predefined process** it just adjusted like this [key projects].”* (Analyst 2, Swisscom, date of interview 14/04/2010) And: *“There are **processes for product development**, which are very much systematic.”* (Analyst 3, Swisscom, date of interview 14/04/2010)

*“Regarding the not regular strategic issues, or whenever something comes up at the competitor where he changes his strategy or so then we make an **ad hoc analysis**”.* (Analyst 4, Sunrise, date of interview 01/10/2010)

Orange and Cablecom analysts identified more structured approaches.

*“Competitive review **process**.”* And: *“There is also the **ad hoc approach**, where we find information from a variety of sources. ... These are much harder to consolidate into a form.”* (Analyst 7, Cablecom, date of interview 29/12/2010)

The respondents appeared to focus on ad hoc and structured approaches depending on the issue, where Swisscom had no predefined process for key projects but had a product development process; Sunrise used performance analysis. Respondent comments revealed the variation in the level of analysis adopted in CI activity. Swisscom analysts noted specific comparative analysis:

*“Also he is doing – when it makes sense – assessments of certain developments in the market. So he sits down and writes a quick analysis for instance of a **new price of a competitor**, a service price or whatever from the competitors and also tries to assess this price against his own price and tries to make some conclusions from this development.”* (Analyst 1, Swisscom, date of interview 12/02/2010)

It appeared that analysis tools were not considered as the main area of effort – to accomplish a task was central for them, the tools varied with topics and analysts. In contrast, Sunrise seemed focused on irregular analyses and on ‘normal’ analyses.

*“The ad hoc analysis is more or less regarding the **not regular strategic** issues, or whenever something comes up at the competitor where he changes his strategy or so then we make an ad hoc analysis. Regarding the **normal analysis** of the competitors, their **financial** performance, their operational performance, this is a repetitive process. So for example we compile a certain kind of **profiling** of the competitors every quarter, which is more or less a short analysis”* (Analyst 4, Sunrise, date of interview 01/10/2010)

Orange seemed to focus on internal processes that were specific to the firm, with focus on direct competition:

*“we look at different aspects of the business, and then we try to map things and activities, so we have **internal ways** to represent competitor activity, competitor positioning, it’s more than guessing and trying to analyse what future moves could be”* (Analyst 5, Orange, date of interview 20/10/2010)

For Cablecom, the operational and strategic analyst noted different aspects:

*One thing where we calculate the actual numbers in terms of customers just in the footprint compare to base numbers and then translate this to the footprint when it comes to market share, **share** of footprint is more important to our business than the actual market share.* (Analyst 6, Cablecom, date of interview 10/11/2010)

Cablecom’s strategic analyst explained it as follows:

*“If information comes from project managers, then it is analysed in various steps.” And “There is a **financial** review board (...) This sometimes is a stepwise process.” (Analyst 7, Cablecom, date of interview 29/12/2010)*

Overall, standard analysis approaches are evident in the Orange framework and in Cablecom’s SFOT), in Swisscom’s use of SWOT/Five forces analysis and in Sunrise repetitive processes. In contrast, tailored approaches emerge both in Sunrise capture of irregular issues (ad hoc) and in Swisscom selectivity in using frameworks. Detailed analyses tend to be complemented by regular market reviews, as noted in the Sunrise strategy review and in the Cablecom financial review process. It is noteworthy that in the case of both Orange and Cablecom, who used companywide analyses (Orange through their lever framework approach, which the respondent was not allowed to reveal in detail, and Cablecom through their SFOT approach), both firms have headquarters outside Switzerland. Both Swisscom and Sunrise did not report such a concerted action; with headquarters in Switzerland, they have perhaps more scope to undertake ad hoc analyses.

5.3.2 Communication Processes

This section considers how departments were involved in communication, and the forms of communication. The checklist provided useful initial information about the nature of CI analyst communication with other managers, as can be seen in Table 5.3.

Table 5.3: Self-assessment of Communication of Analysts from Checklist

Firm’s Analyst (q3)	Board of Directors	Marketing Managers	Functional Managers	Line Managers
Swisscom 2010 strategic analyst	Applies	Applies	Applies	Applies
Swisscom 2010 department analyst	Applies	Applies	Applies	Applies
Swisscom 2010 strategic analyst	Applies	Does not apply	Does not apply	Applies
Sunrise 2010 strategic analyst	Applies	Applies	Applies	Applies
Orange 2010 strategic analyst	Applies	Applies	Applies	Does not apply
Cablecom operational analyst	Applies	Applies	Applies	Applies
Cablecom 2010 strategic analyst	Does not apply	Does not apply	Does not apply	Applies
Cablecom executive assistant of CEO	Applies	Applies	Applies	Applies

To whom they communicated depended on how CI was organised. When allocated centrally, the CI analysts communicated with all levels, while for decentralised CI staff,

their communication was restricted to those who were most concerned (own department and few others). It is noteworthy that the Board of Directors were involved in all four firms as CI deals with strategic issues. In considering forms of communication, Swisscom analysts noted a broad approach:

*“You send out a competitor information **newsletter**, which contains all the new information you have collected from observing the market for instance: new products or new actions from the competitor.... You can also do this more specific you can send out an **alert**, which is a very urgent information, which falls out of the regular process....”* (Analyst 1, Swisscom, date of interview 12/02/2010)

The Swiss strategic analysts were involved at all levels of planning for CI involving both formal and ad hoc approaches. They were both pleased to engage with query-based interaction when planning CI projects. Swisscom’s other respondent used a portal called INKA to find CI information and other portals where their colleagues could find information.

*“We **present the outcome** of the analysis directly to the audience who is concerned, or if it’s a more or less shorter analysis we distribute it via outlook. Otherwise communication, is talking directly to the respective persons.”* (Analyst 4, Sunrise, date of interview 01/10/2010)

Sunrise’s respondent identified formal presentations and email for those analyses which concerned a bigger audience, and more direct talking with key managers outside of that. She identified all levels to communicate with as their CI team was organised such that all departments and levels could get information from it.

*“Then you could imagine that the structured / recurrent which is made on-going is more the overall **communication**, for the project communication this is **on-going**, this is in a way the same, and then you have an ad hoc part for more the confidential, the strategic projects, So for purely competitor intelligence we debate using **internal exchanges** mostly through **email**, there is no portal, there is no structured approach. Someone would come up with information, dispatch it to a few people, and potentially if of importance, would be dispatched to another several people, so it is pretty based on an ad hoc basis and not a process.”* (Analyst 5, Orange, date of interview 20/10/2010)

Orange’s respondent identified structured and unstructured approaches, similar to the other firms. He identified email communication, and internal exchange debates.

*“When it comes to general communication, internally we have the **intranet portal**, which is used quite heavily with our information, which should be available, to all employees, and this system is very developed and it is really useful. you can make your own **blog** there.”* And: *“Just **email** communication - if there are some questions it can be handled privately, come back, using Excel sheets to translate this into a readable format.”* (Analyst 6, Cablecom, date of interview 10/11/2010)

The pattern for Cablecom operational analyst was similar, but he emphasised their portal, which was used for email, blog, and to get information. In contrast, the strategic analyst focused the importance of formalised meetings with line managers:

*“The outcome of the prioritisation process of project reviews for example is largely communicated through **formalised meetings**. (Analyst 7, Cablecom, date of interview 29/12/2010)*

It appeared that the communication process of this firm was highly organised and somewhat hierarchical, with communication channels varying with CI analyst position:

*“We also have a kick off of early work, and we have an **information meeting** where we take all employees, colleagues, and the senior management in front.”*
And: *“We have also a communication **portal**, where we share ad hoc information to all colleagues, and sometimes only internal information that also comments public information.” (Analyst 8, Cablecom, date of interview 29/12/2010)*

Cablecom’s executive assistant reinforced this impression of formal, structured internal communication and reporting channels around CI projects.

We can conclude that both informal and structured approaches to CI communication were identified. Sunrise and Orange reported that they communicated with all levels, as they are the only responsible CI analysts at the site, with structured approaches for recurring and formal communication. Cablecom reported formalised meetings and a rich array of tools, indicating a more comprehensive communication of CI outputs. Swisscom was in the process of developing their *communication* of CI outputs, which indicates that some issues need more development (e.g. feedback). Overall, while information reporting and distribution was quite standard (email, newsletters, portals etc), across firms, information sharing practices seemed to vary – between more organic patterns outside of formal meetings occurring for Swisscom and Sunrise analysts for feedback. Ad hoc communication occurred on a frequent basis for unexpected and important issues in both firms. Table 5.4 shows an overview about CI Management in the case firms.

Table 5.4: Summary of CI Management in Firms

Process Firm	Focus and planning	Data Analysis	Communication
Swisscom	Individual, flexible, ad hoc, focus from centre and departments	Various analysis tools	All levels, feedback on demand, various ways to communicate face to face, presentation, email, newsletter, structured and ad hoc approaches
Sunrise	Structured, planned, focus too narrow (lacks flexibility)	Regular competitor analyses	All levels, internal exchanges, ways to communicate are email, face to face, newsletter, presentation, structured and ad hoc
Orange	Structured, focus too narrow	Internal framework	All levels but line managers, on-going exchange, email, ad hoc
Cablecom	Ad hoc and flexible, headquarter and firm involved	Projects, financial reviews	All levels, email, communication portal (blog), formalised meetings (process), ad hoc

In line with their CI planning, both Sunrise and Orange reported structured *analysis* approaches, either based on a structure (Sunrise) or a framework (Orange). In contrast to this, Swisscom and Cablecom reported flexibility in CI analyses application, both strategic and operational. Both Sunrise and Orange reported highly processed CI outputs, while Swisscom and Cablecom strategic analysts outlined that CI outputs varied in nature across projects, but they emphasised their CI involvement in strategy. Section 5.5 takes a deeper look at analysis approaches of each firm under CI Content.

5.4 CI Quality Factors: Feedback, Networking & System Capabilities

When considering CI quality, we identified indicators of effectiveness and sophistication in Table 3.1 and 3.2. A detailed evaluation of process effectiveness for Swisscom, Sunrise, Cablecom and Orange is set out in Appendix VII. Key highlights of this analysis are reported here – in particular, two aspects are addressed for effectiveness- a) evidence of analyst involvement in CI Planning and b) how well CI analysis seems to be managed or aligned within the firm. In terms of involvement in CI planning, variation is evident in how firms deal with regular CI and unexpected CI project tasks. Swisscom did not specify CI planning – they did not identify standards for CI analyses, rather adopted an approach where relevant analyses are chosen, most of which are ad hoc in nature “*My tasks contain about a 90% ad hoc queries. There are very few repetitive issues*” (Analyst 3, Swisscom, 24/04/2010). . Sunrise had criteria for

CI planning, but they are not shaped to fit specific CI needs and topics; CI planning at Orange was structured, but analyses were not adapted to the market and there was a narrow focus on sales in examples used. Cablecom had a formal set of criteria for CI planning, but their tasks are project centred, thus they did not include CI in their general approaches.

*“We have a competitive review process, where we **systematically** [process CI].”*
Asking the analyst if **most of the issues are project based** he explained: *“Yes, because, if an issue comes up with management request ... the answer comes basically as a project. (Analyst 7, Cablecom, date of interview 29/12/2010)”*

Therefore, the approach was firm-specific and this suggests that CI planning occurred, but the level of analyst involvement in the process has perhaps a low priority in many firms in the telecom sector.

In terms of how CI analysis was aligned within the firm systems, all firms engaged in market scanning, with many regular analysis activities being undertaken. One area in which firms differed was in whether the analysis was systematic or ad hoc -the criteria indicated that both are needed. Swisscom applied selective analyses, dependent on the analyst choice:

*“As different as the people are at Swisscom, as different are the models they apply. Some are fan of the five forces model of **Porter**; others prefer to make analysis with the **management model of St. Gallen**, where an economical system can be portrayed.” (Analyst 2, Swisscom, date of interview 14/04/2010)*

For Sunrise, some techniques were systematic, with a common companywide approach, but with a lack of different viewpoints. To balance this disadvantage, they held regular brainstorming meetings with other managers.

*“We gather information about the **positioning of the main competitors in the market. Besides the financial and operational key performance indicators.**”*
(Analyst 4, Sunrise, date of interview 01/10/2010)

For Orange, sophisticated, systematic techniques were provided from headquarters but there appeared to be no balance with less informal analysis. For Cablecom, sophisticated analysis techniques were provided from the headquarters as benchmarks, but the focus was quite narrowly defined on direct competitive actions and customer management, with less acknowledgement of broader issues. Overall self-evaluation of an effective process indicates that the CI Process fits with analysts needs as reported from Orange, Sunrise and Cablecom in Table 5.5 below.

Table 5.5: Assessment of Effectiveness and Sophistication of CI: Processes and Systems in Firms

	Swisscom 2010	Sunrise 2010	Orange 2010	Cablecom 2010
Effectiveness				
Analyst involvement in strategy	Strategic and department analyst roles, query-based recommendations from varying analyses, four times an year answers to relevant questions	Strategic analyst role predefined annual strategy process with analyses and decisions	Strategic analyst role, present output to management from customer and competitors	Strategic, corporate and operational analyst roles, adapt corporate directions to local market
Multiple Communication Channels	Communicate to whom it concerns, presentation, individual meetings, portals with tailored access	Distribution lists information to whom it concerns	Regularly report to highest level of company, for product launches communicate ad hoc	Project process with decisions and memorandum, program of change, portals for ad hoc information and customer care
Internal Alignment of systems	Systems are adapted to users' needs	Few systems, users apply mainly Microsoft office	Portals from headquarter not adapted	Portals from headquarters not adapted, but information is tailored to market
Sophistication				
Emphasise communication	No emphasis on communication, but some communication structures established	Communication not emphasised, but structured meetings	Communication not emphasised, ad hoc and structured communication	Communication emphasised, structures and process for communication
Emphasise networks	Deliberate feedback about sources and analyses	Analyst asks for feedback about sources and analyses	Analyst asks for feedback about analyses	Feedback about process, mostly feedback on demand
System capabilities	Systems process quantitative data, analysts deal with qualitative data	Qualitative and quantitative information is processed by the users	Data mining team and headquarter deal with data on demand of analyst	Operational analyst deal with mainly quantitative data, strategic analyst with mainly qualitative data
Firm level	Market let CI process, communication ad hoc and not emphasised, deliberate feedback	CI process not adapted to market, communication patterns, feedback on demand	CI process not adapted to market, communication patterns, feedback on demand	CI process adapted from headquarters, emphasis on communication process, feedback mostly on demand
Market level	New entrants challenge the case firms with alternate services. The case firms show few emphasise in dealing with these challenges. Only Swisscom appears to focus on market changes through means of market let CI process and established feedback			

Where issues arose, they occurred mostly when examining the degree of interaction and the link to decision-making and performance. Orange is an interesting case, as it demonstrated contradictory patterns. They were strong in priority setting, with a well-structured link to the strategy process:

“You even have analysis on our key competitors like Swisscom, Sunrise, and Cablecom, which is done in Paris ... by the Market Intelligence team, ... which we can download.” And: *“[The] **decision-making process** ... is usually done under a presentation mode or other. You ... have **three options we recommend one**.* (Analyst 5, Orange, date of interview 20/10/2010)

Their own view of process effectiveness was that it was at a high level, but they acknowledged that there was limited decision support. The evidence of a clear link to decision-making process is cancelled out by problematic management support for the CI analysis team at firm level Process (see Appendix VIII Tables VIII.1 through VIII.4).

An issue was also raised in terms of adaptability of analysis approaches and the capacity to tailor analyses. There was, as noted above, no possibility of adaptation by the Orange analyst, he relied a lot on his own resources.

*“An **informal** way, whenever you are in an audience and you are presenting something, it’s about **what do you think** our **competitors** are going to do, there is a positioning to our competitors what we think that they are going to react.”* And: *[The **formal** way is] we have levers about money, about emotion. We have **a lot of levers**, levers about the brand. We know we have a good understanding about [how] our different parts in the market are playing with those levers.”* (Analyst 5, Orange, date of interview 20/10/2010)

On the other hand, Cablecom use an elaborate priority setting process, which speaks for their effectiveness to bringing CI and management decision together. It emerged in the interviews, however, that this was standardised, without adaptation to the Swiss market, rather with a focus on core HQ strategy:

*“Well there are lots of decision-making processes that are step wise, that go from meeting to meeting to meeting, and end in the senior management meeting, where major **strategy is prioritised**.”* (Analyst 7, Cablecom, date of interview 29/12/2010)

In considering sophistication, two elements that were emphasized were a) communication and b) systems capabilities. For Swisscom, their query based strategy process was strong, but they acknowledged a wish to improve their communication processes

“There is no specific concept, there is a certain systematic approach of course but this is not a magic or clever process you use your communication to distribute your information.” (Analyst 1, Swisscom, date of interview 12/02/2010)

For Sunrise, their strategy process includes clear focus on performance relevant themes, their own view showed a need to improve their system capabilities.

*“We have a **defined strategy process**, which is starting at the beginning of the year.”* And: *“We present the outcome of the analysis on the one hand in certain **presentations directly** made to the audience who is concerned, or if it’s a more or less shorter analysis we **distribute it via email** to the respective audience.”* (Analyst 4, Sunrise, date of interview 01/10/2010)

Cablecom, at first glance appears to have the strongest communication process.

*“**Depending on the hierarchy level** [SFOT] is used [adapted]. We have various **tools to use this, and share, and summarise, and distribute this.**”* (Analyst 8, Cablecom, date of interview 29/12/2010)

In their view, their processes are effective but they see a need to develop systems:

“We recently introduced three years ago a strategic function, which is in charge of monitoring the general direction that Cablecom is heading to”

Findings on process sophistication suggest that in the two firms with the more developed CI activities, analysts can be involved with decisions through networking but also by learning through *feedback*. Campbell (2004) identified key components of a robust CI methodology as: *“Design and setup; information collection; analysis; dissemination; **feedback** (system reset).”* For firms with developed CI processes (Swisscom, Cablecom), *feedback* systems were better established than in those with developing CI processes (Sunrise, Orange). Vitala (2004) indicated that feedback from leaders enhances the learning process of analysts about decision preparation. The analysts confirmed that learning from feedback is important and took different forms, where different actors are involved in projects (Swisscom, Orange, and Cablecom). Appendix VIII Table VIII.5 offers some further analysis of the perception of system effectiveness and sophistication.

5.5 Variation in CI Organisation support structures for CI – Organisational Lens

5.5.1 Mix of Centralised and Decentralised Structure for CI

A checklist was used in addition to the interviews, asking the respondents about CI analyst deployment in firms. A summary of their organisational structure for CI is noted in Table 5.6 below.

Table 5.6: Summary Organisational Structure for CI in Firms from Checklist

Firm's Analyst (q4)	Department	CI unit and Organisational Structure
Swisscom 2010 strategic analyst	Group Strategy & Steering	Strategy and business development, decentral
Swisscom 2010 department analyst	Various departments	
Swisscom 2010 strategic analyst	Strategy and Business Development	
Sunrise 2010 strategic analyst	Strategy & Business Intelligence	Strategy and business intelligence, central
Orange 2010 strategic analyst	Corporate Strategy & Regulatory Affairs	Strategy and regulatory affairs, central
Cablecom 2010 operational analyst	Strategy	Strategy and business intelligence, decentral
Cablecom 2010 strategic analyst	Business Intelligence	
Cablecom executive assistant of CEO	Marketing, strategy, network, customer care	

Cablecom employed CI analysts in the strategy department for operational tasks and other CI analysts were placed in a decentralised way in several departments, liaising with the centre. The analyst at Cablecom noted how firm had gained from decentralised information exchange:

*“During the crisis time of Cablecom we saw that there is a **silo thinking** [...], and we tried and we have succeeded breaking up these silos, and **share information much more frequently, much more happily between departments.**” (Analyst 7, Cablecom, date of interview 29/12/2010)*

Cablecom's Swiss CI teams were in close contact to the headquarters in Amsterdam. The strategic analysts linked systems manually, there were portals for communication, and customer care, systems and links lacked. Analyst 8 said:

*“We have a **special portal** for customer care.” (Analyst 8, Cablecom, date of interview 29/12/2010)*

The operational analysts worked ad hoc on competitor information and used comprehensive competitive update report. He explained:

*“I send our competitor information to part of the middle management and to the senior management, and there are of course some regular meetings, within these meetings, if necessary they discuss our performance and the market performance, and based on these meetings we have some **decisions**.”* (Analyst 6, Cablecom, date of interview 10/11/2010)

Cablecom’s operational systems were Clarify and MS Office to gather, process, and prepare information for decision-making. A management information system was used for internal information, some modelling for forecasts in Excel; and the knowledge management system was relied on for data for marketing decisions in Clarify. Analytical tools for decision-support included budget plans, benchmarks of performance, and competitive updates. Cablecom’s operational analyst mainly used MS Office but accessed the management information system. Overall Cablecom had an ad hoc approach at operational level, while using a more systematic procedure for planning strategic CI projects and generating weekly KPI information.

In contrast, the analysts from Swisscom reported some central staff but employed CI analysts in key departments, showing a decentralised pattern.:

*“The whole thing is **decentralised** to be close to the (internal) customers. There are only few centralised issues as for example Forrester, Gartner, which is centrally bought.”* (Analyst 3, Swisscom, date of interview 14/04/2010)

The management information system was linked with data mining generating automatic reports, and weekly or monthly updates, as the analyst explained:

*“What surely is **connected is the Management Information System with all issues** coming from the data mining, so the systems generate automatic reports, and weekly or monthly updates. But the other issues not containing just digits **are as far as I know not interlinked**.”* (Analyst 2, Swisscom, date of interview 14/04/2010)

System links were established to facilitate information transfer. This appeared especially helpful for decentralised teams.

Sunrise organised their analysts centrally – Sunrise’s analyst explained during the interview that CI was organised in one team (central) when stating:

*“In the past we had some kind of competitor intelligence distributed over the company because every department or every unit they had to look after our competitors, but when I started in Sunrise **we centralised this kind of information**.”* (Analyst 4, Sunrise, date of interview 01/10/2010).

In contrast, Sunrise’s competitor information was centrally structured depending on the information. Their analyst, who seemed proud about that, explained:

*“Sunrise [in 2008] we **centralised this kind of information**. ... It’s more or less centralised and whenever somebody has or wants competitor information they call us because we are guarding such information.” (Analyst 4, Sunrise, date of interview 01/10/2010)*

The analyst was responsible for this organisational change. Nevertheless, it was a small team of analysts and systems were not developed other than Knowledge Management. Processing competitor information was through the analyst with constant information flows with specialised departments.

In contrast to Swisscom and to Sunrise, in the Orange case, there was just one centrally located CI analyst (the respondent) coping with CI activities on a part time basis. Orange placed the analyst centrally in the department of corporate strategy and regulatory affairs. He reported the need to adapt products to government regulations.

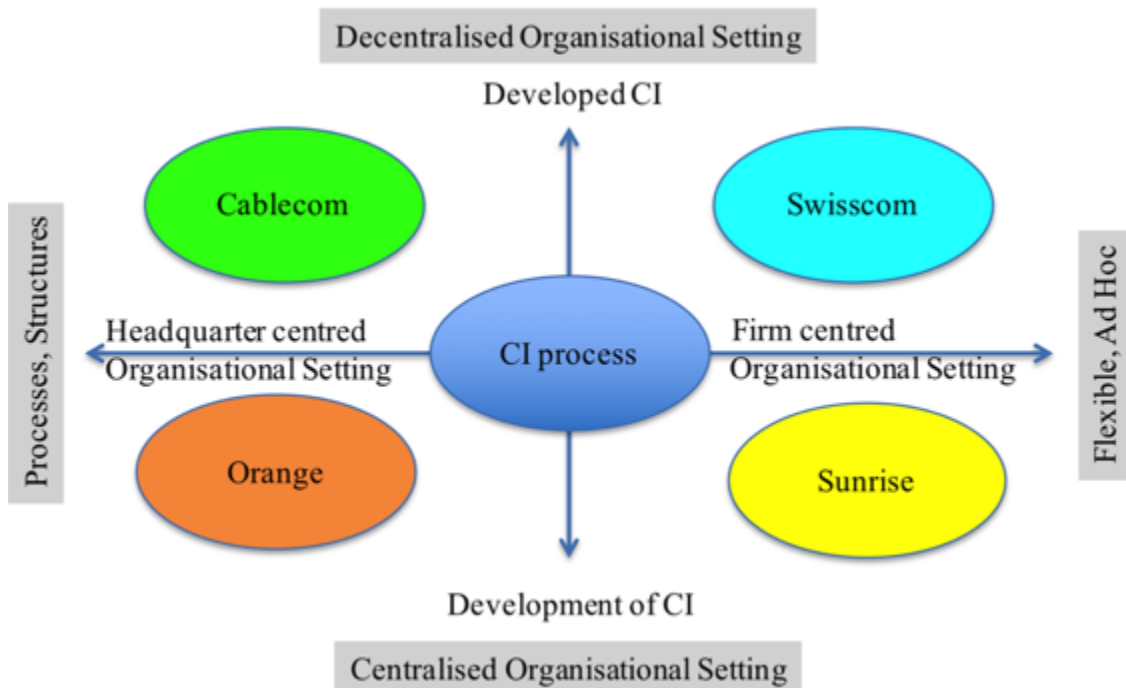
Concerning organisational structure Orange challenged itself to have a balance. The analyst answered the question, if they were decentralised as follows:

*“Yes, that’s a reasonable assumption, but we are not decentralised for the **centrally located topics**. That is why we challenge us to have a balance. We have centrally located stuff, to match what is done centrally and what is not done centrally.” (Analyst 5, Orange, date of interview 20/10/2010)*

They were decentralised for specialised topics, centralised for centrally located topics. Analytical tasks and communicating competitor intelligence were tailored for centralised and decentralised issues. However, Orange employed only one-part time intelligence analyst – he relied on a central CI department for Orange Switzerland through a powerful portal and strong data access procedures, but there was no local analysis capability. Excel lists were developed about events, trends and tendencies, and ad hoc analyses.

Overall, the patterns show that all firms had CI analysts placed close to strategic units. Inspecting the number of CI analysts, it becomes clear that Sunrise and Orange could not be decentralised, due to numbers (Sunrise: 2, Orange: 1), while Swisscom and Cablecom noted a high number of analysts in different departments in positions to focus on critical CI issues. Figure 5.1 shows preliminary team organisation patterns for CI activities.

Figure 5.1: Overview of how CI teams are Organised



A centrally performed CI Process is not as flexible as a decentralised process (see Trumbach and Elofson 2007; Dong *et al.* 2012) but this may be linked to stage of development – Sunrise and Orange reported their CI processes to be at an early stage – their analyses and systems were adapted in a best fit at firm level to their needs. Sunrise also had centrally organised CI, but reported close contact with frontline managers – for instance, Sunrise’s weekly brainstorming meetings provide contact with managers and the necessary feedback to develop their CI Process.

5.5.2 CI Analyst involvement in Decision-Making

CI analysts discussed the strategy process as important for their involvement in decision-making. Swisscom’s strategic analyst explained how it was done in the past.

*“Usually it [analysis from the competitor] will be part of a presentation, or a documentation, so usually you have to make as an outcome of this project a final report, and your contribution, **the CI contribution**, ... you describe your findings. this [report] it can be the reason, why we created this project, what’s behind, is it a certain idea, a certain danger, which we expect in the future, or is it a project to increase market share of this company. It can be all strategic pulls and pushes so to speak in a company.”* And: *“The [reports] usually should follow a certain structure, so this is part of the strategic process in the company, which defines a*

structure and CI should be part of this structure.” (Analyst 1, Swisscom, date of interview 12/02/2010)

Swisscom’s other respondent described a structured report and presentation within the strategy process.

*“there are **strategy processes**, looking at different problems by the board of directors, and very often the competitive situation in Switzerland, and here the information is systematically concentrated and presented to the board of directors. But mostly there are different strategic questions about the future and then there are presentations, one seeks to find **answers to various scenarios**, and it is difficult to show a typical case. Project teams look at questions and present their results, and depending how important this is, it can go to the corporate management, or later to the board of directors” (Analyst 3, Swisscom, date of interview 14/04/2010)*

The link between CI and management at Swisscom is query based, with strong priority setting:

*“This is **heavily query based**; one has the impression that the board of directors want answers to them. He wants answers to the most urgent questions and not every time this huge strategy document always providing the same content.” And: “Within Swisscom there is a strategy process. In the earlier days, it was done at certain situations, where comprehensive strategic reports / presentations were written. Today, this is merely done in a query-based form.” (Analyst 3, Swisscom, date of interview 14/04/2010)*

Sunrise’s respondent noted involvement with an ongoing strategy team, which was part of their work throughout the year.

*“My team, which is called business intelligence / market intelligence is part of the strategy team. So competitor information, market information is strongly connected to the strategy.” And: “We have a **defined strategy process**, which is starting at the beginning of the year and we make certain decisions, certain analysis...” (Analyst 4, Sunrise, date of interview 01/10/2010)*

Orange did not report a strategy process, but their framework addresses the same issues as for the other companies. As Cablecom’s operational analyst was not involved in strategic issues, he was not directly involved in communications on strategy. Cablecom reported that their strategy process was now more focused on competitors.

*“The **strategy process** also has made a big step I would say. This has improved a lot as we recently introduced three years ago a **strategic function**, which is in charge of **monitoring the general direction...**” (Analyst 7, Cablecom, date of interview 29/12/2010)*

In terms of link to decision-making, presenting CI output as part of the strategy process and some involvement in decision-making was evident in all four firms. Sunrise and Orange explained highly structured processes, where involvement was official but there

was a sense of not being involved at the higher levels. A contrasting view emerges in Swisscom and Cablecom.

5.5.3 Adoption of Information Systems

Information systems can support each element of CI Management by structuring and storing data or supporting analyses. Across firms, variation in use of information systems was noted. Looking at the evolution in information system use, we can take each case in turn and trace how their information systems were expanded.

Swisscom's analyst reported that in 2006, they used Knowledge Management in a limited way, as there was no link to Business Intelligence. The strategic analyst of Swisscom explained how it was done in the past:

*“There were certain parts, which can be treated as Knowledge Management, but this is not really Knowledge Management for certain departments this information was stored in some **databases** and from there **transferred** to other units or to other people who read this information to do their work.”* (Analyst 1, Swisscom, date of interview 12/02/2010)

No decision support system was used – as the analyst noted ‘*There were **processes** so to speak, but no systems*’. The use of Information Systems appeared very limited. This contrasted with Swisscom's 2010 situation, where a few systems were in use – one Competitor Information System solution was a Competitor Radar Portal to observe competitors. Within a human Decision Support-System they amended recommendations from the project team to a board, key findings from ad hoc requests, and gave priorities to key projects. The analyst explained:

*“**Decision Support System**: I would not call this a system. We amend certain **recommendations** through personal contacts, or through key findings from ad hoc requests or researches. These are recommendations, but I personally never encountered a process or that one would be invited when it concerned an important decision. It happens merely through a **written or personal contact**.”* (Analyst 2, Swisscom, date of interview 14/04/2010)

In 2010 Swisscom's Knowledge Management was mainly implicit for both interviewees, just a Wiki for Knowledge Management. The analyst explained:

*“**Knowledge Management System**: it exists beside the Competitor Radar Portal (an open source solution), there is a site at the intranet publishing certain **internally produced studies**. To view these studies, one has to apply for an access.”* (Analyst 2, Swisscom, date of interview 14/04/2010)

Their Wiki for Knowledge Management contained articles about topics relevant for Swisscom. It enables connections and works similar to Wikipedia (edit, and add articles) enabling to share knowledge. The development of Competitor Information System was notable. In 2010 there was a Management Information System entry portal into all the financial reports. Swisscom could identify support of information systems for each task linked to competitors. The analyst explained:

*“We have that at Swisscom, it is also a portal on the intranet. This is the entry portal into all the **financial reports** and reporting, which are mainly provided by the controlling for Swisscom.” And: “**Management Information System** has various functionalities apart from the lack of being able to track versions and the option to edit documents. It reminds me at Microsoft Share-point.” (Analyst 2, Swisscom, date of interview 14/04/2010)*

In contrast to Swisscom, Sunrise had a range of knowledge management solutions: a specific knowledge management for customer management, a central company-wide knowledge management solution, and smaller knowledge management system for the units targeting information important for them. Apart from their knowledge management solutions the analyst only used MS Office. She explained:

*“A kind of **central Knowledge Management**, which is company-wide, but for certain units within our company we have also some **smaller Knowledge Management System**, which only targets those kind of information, which is important for that unit. For example, we have a customer care unit within our company and they have a specific Knowledge Management System where all kind of **customer care issue information** is included.” (Analyst 4, Sunrise, date of interview 01/10/2010)*

Orange’s analyst was excited that they had a comprehensive range of information systems (mostly developed at headquarters). He identified that competitor information system and management information system were closely related:

*“[There are] two levels: at the local level not a portal, **market intelligence** portal if you wish, but more on an ad hoc basis with **excel tools** we send to key peoples and at the group level it’s much more. And that would be for **Competitor Information System. Management Information System** is actually closely related to the previous one.” (Analyst 5, Orange, date of interview 20/10/2010)*

A central data mining team extracted data based on request. The specialists did the analyses. The analyst pointed out how this was managed:

*“We have a **Data Mining solution**, we have a team, who is basically specialising **extracting our data usage patterns**, we get data out of the system and then the specialist in the company, it could be a sales specialist, it could be a **customer care team**. The data mining team do extract the data, based on a request, and then the analysis is done somewhere else.” (Analyst 5, Orange, date of interview*

20/10/2010)

However, when probed about their link to this data mining system, all this analysis occurred at HQ level, and a lot of the analysis focused on customer management (a CRM system) – linked to comparative customer phone usage information to build patterns. The Knowledge Management System portal allowed access to daily reported KPIs, and human resources data. The analyst explained:

*“We have a **portal about all our internal information**. We can access millions of KPIs that are reported every day. I guess that would qualify our **Knowledge Management System**.”* (Analyst 5, Orange, date of interview 20/10/2010)

Orange identified system support wherever data were to be supplied for analyses. The analyst gave the impression of having a big team at headquarters to support analysis, but from his checklist answers it became clear that he worked only part time for the task of CI – it was not surprising that CI was at an emergent stage.

In contrast to the wide range of solutions from Swisscom and Orange, Cablecom’s operational analyst noted only basic use of information systems., including Clarify (a dedicated customer management approach) and MS Office to gather, process, and prepare information for decision-making. The analyst explained:

*“We in Cablecom use of course **Excel** to prepare the information and make them visible to the management we use all public available information like newspapers, annual reports, Internet, gathering the information, ... and publish them internally as Excel or **PowerPoint**. Our internal **customer management system is Clarify** with SAP interface for all the Customer Premises Equipment [CPE] management. That is more or less the main (information) systems we use.”* (Analyst 6, Cablecom, date of interview 10/11/2010)

The analyst identified some CI decision support for Long Range Planning but this seemed to be restricted to budget plans. He explained:

“[Budget plan] is part of the information for decision-making or it is part of the information used to elaborate the LRP [Long Range Planning] and to come to a budget for the upcoming year.” (Analyst 6, Cablecom, date of interview 10/11/2010)

He delivered information with comments, guidelines, descriptions, and assumptions, using no Competitor Information System, but did basic financial modelling for competitive updates with budget forecasts, which was done in Excel:

*“I mean there is **no [Competitor Information] System** in place, which is hard- or software related, we see what **information** is available and then **put it together**, and develop a **competitive update**.”* (Analyst 6, Cablecom, date of interview 10/11/2010)

He focused on customers and competitors. Clarify matched information with the customer base. Knowledge management system was used for product marketing decisions, management information system for internal information (plans, achievements, network roll out, and customer forecasts). The analyst explained:

*“Our **management** information system not in terms of competition, but ... in terms of what is happening in the company. ... There is information available what is planned, what is achieved, in terms of network roll out, in terms of customer acquisition, in terms of churn - we also making a projection on churn.”* (Analyst 6, Cablecom, date of interview 10/11/2010)

This was contrasted with Cablecom’s strategic analyst who said he applied all information systems but on an ad hoc basis:

*“In general terms Cablecom uses a rather **ad hoc approach** to gather and systematise information. That means that the systems are probably used in some form but **not under these names** and not particularly used based on these definitions mentioned. Business plans are in Excel spread-sheets... use all information that becomes available, and analyse projects.”* (Analyst 7, Cablecom, date of interview 29/12/2010)

The analyst generated weekly KPIs and reports from operational leaders as a basis for management decisions on tasks to take forward. He expected departments act on competitive information, but this was not collaborative. A checklist was used in addition to the interviews, asking the respondents which information systems they used processing CI data. Each information system supports specific CI tasks, as outlined in Table 5.7 below.

Table 5.7: Self-assessment of Information System Applications from Checklist

Task (q8) Firm	Monitor data	Analysis	Manage Internal Information	Commentary on applications
Swisscom	CIS, KM, MIS, DSS	MMS	CIS, MIS, MMS, KM, DSS	Systems, Portals, knowledge management for internal studies, decision support recommendations
Sunrise	Power Point, Excel	PowerPoint, Excel	PowerPoint, Excel	Companywide and unit specific knowledge management for customer care, MS Office Excel spread sheet
Orange	CIS	CIS, MIS, MMS	MIS, KM	Headquarter: Systems, Portals i.e. for internal information, local: excel spread sheets for competitor information and management information, data mining
Cablecom	MIS, KM, DSS	Excel, CIS, MIS, MMS, KM, DSS	Etouch, MIS, KM, DSS	They had a traffic light approach for risks, systems, Clarify and MS office Excel spread sheet, portals, process

Acronym: Competitor Information System (CIS), Management Information System (MIS), Mathematical Modelling System – also Excel spread sheets (MMS), Knowledge Management System (KM), and Decision-Support System – also human support (DSS).

While Swisscom reported the use of information systems and portals for CI and internal information, Sunrise just used systems for internal information (KM), while CI information was processed by using for example Excel spread sheets, and presentations using PowerPoint. Orange noted their own systems, similar to Sunrise, but the headquarters (France Telecom) provided an array of information through their portals. Cablecom's analysts noted that systems [mostly informally] were adapted to the respective department with a focus on adaptation to local markets. Thus Swisscom and Cablecom have systems [or less formal analyses] tailored to their needs, while Sunrise used merely basic systems and Orange used systems not adapted from headquarters.

In terms of scope of inputs to the CI process, information systems were mostly used for monitoring purposes – they were applied to store external data and structure internal information. It seems noteworthy that Cablecom's strategic department worked together with the headquarters in Amsterdam and as such had the opportunity to use their information systems while this was not possible for their operational tasks. Orange could also profit from information portals from headquarters. Swisscom could afford to develop/adapt their systems. Due to its size and market share in Switzerland² (Section 2.2, Table 2.1 on Market Shares) and the regulations (WEKO 2010), it is still possible for Swisscom to maintain its forerunner position in the deployment of information systems. Nonetheless, these were not being applied at an advanced modelling level. This is of interest as it gives an indication of the analysis capacity of each firm, which is further investigated in the next section - CI Content.

² With a share of 56.77% the Swiss Confederation is still the main proprietary of Swisscom (Swisscom 2013e).

5.5.4 Explicit and Implicit Approaches to CI in the case firms

5.5.4.1 Explicit CI Approaches: Information Systems, CI Organisation

While the CI support structure (CI Organisation) seemed to be oriented toward more explicit or more implicit approaches, it also shaped the application of analyses (CI Content). This view is relevant to CI organisation, as it offers insight into how firms emphasise a structured CI process (explicit) or a more ad hoc and query-based approach (implicit). It evaluates how far firms with developing or developed CI processes tend towards one approach or the other.

There was variation in views of analysts toward explicit information systems and how well they can be integrated into market level analysis. One Swisscom analyst was not very enthusiastic about the solution when he explained:

*“My experience is with BI (Business Intelligence) information, which is usually **stored in Data Warehouses** or something like that. BI information **contains information** about the customers of this company, in this case for Swisscom or Sunrise or whatever.”* (Analyst 1, Swisscom, date of interview 12/02/2010)

In 2010 Swisscom’s Competitor Information System solution was a Competitor Radar Portal to observe competitors. A second Swisscom analyst was enthusiastic about their information systems when he explained:

*“A CIS: we in our area have a so-called ‘**Competitor Radar Portal**’. This is a portal accessible from the intranet. All the **information** from Switzerland, but also Europe is **stored** there such that people can collect them using a search function. This information is openly **accessible** lets say news alerts, or dispatches from newsletters, newspapers. This kind of information is fed into the Competitor Radar Portal.”* (Analyst 2, Swisscom, date of interview 14/04/2010)

The structure to deposit documents was similar to Microsoft Share-point. Share-point allows exchanging and communicating within a firm, with development options and planning tools (Sharepoint 2013).

Sunrise used Data Warehouse and their analyst was also enthusiastic:

*“We have a **Data Warehousing** solution in our company and there a lot of data is compiled in this system. It’s a software called ‘**business objects**’ and then a lot of information providers from our company **include certain information** in this data warehousing solution, but it’s not about competitors it’s only **internal data**.”* (Analyst 4, Sunrise, date of interview 01/10/2010)

Orange's analyst noted, however, a restrictive use of competitor information systems. It appeared that data were either restricted by divisions, or on portals. The competitor information portal allowed accessing trends and tendencies (usage, attitude, new products and services, emerging products), and information about key competitors. He did not emphasise the systems but more the application. The analyst explained:

*“Then we have two levels here: the first level is the **local level** here in Switzerland, where **we do not have a portal** solution as such. So that would be for me **Competitor Information System**. We also have a second level, a **group level** from France Telecom. There we have **a big portal** with lots of information for all the tendencies in the market being usage, attitude, new product, new devices, new services, emerging products successful in other markets.”* (Analyst 5, Orange, date of interview 20/10/2010)

The analyst took always the time to broadly explain his experience, giving a balanced view of Orange's organisational situation. This was especially helpful, as Orange was part of France Telecom at the time of the interview, which provided portal solutions and market analyses to Orange. It is also interesting that France Telecom seemed not too interested in Orange, which explains the later investments from APAX in 2012 (Apax 2013), and the takeover of Orange by Niel and its change of name to Salt in 2015 (NZZ 2015).

In 2010 Cablecom's operational analyst noted himself to be operational only and felt that he had limited opportunity. Sources used were publicly available (newspapers, annual reports, Internet). Competitive information was based on market assumptions and developments and data were stored in an Excel database, and Clarify. He was dismissive of the nature of sources used, noting that *“**Excel** is the database (laughs).”* (Analyst 6, Cablecom, date of interview 10/11/2010). This contrasted with Cablecom's strategic analysts who explained two approaches. He was keen to discuss competitor information when stating:

*“The publicly available sources are **annual are quarterly reviews**. In the systematic approach we put this information in a report or presentation form, and **compare the different indicators from each competitor** ... for our presentations and reports, quarterly or monthly. There is also the **ad hoc approach**, where we find information from a **variety of sources**, these include for example newspaper articles, information gathered at congresses, conferences, individual rumours, ... the market, chat between individuals. These are much harder to consolidate into a form. But still we try to have a **text part**, and we put as much **hard facts** as much as we know them.”* (Analyst 7, Cablecom, date of interview 29/12/2010)

The strategic analysts of Cablecom made clear that information systems were intensively used and that information distribution was very comprehensive. He gathered and collated information into a systematic form. He worked in projects, with communication flows of the processed information from the review. Asking the analyst if most of the issues are project based he said:

*“Yes, because, if an issue comes up with management request, ... and the **answer comes basically as a project.**”* (Analyst 7, Cablecom, date of interview 29/12/2010)

Some elements appeared to be processed (prioritisation of projects), others less structured (issues are treated as projects).

5.5.4.2 Implicit CI Approaches: Information Flows, Communication Structure

Miller (2008) identified implicit rules of the market by stating:

*“The high level of allocative efficiency in experimental markets is driven largely by the **‘intelligence’ implicit** in the rules of the market.”*

Woolley (2011) noted how a good strategic orientation is aware of the strengths of opponents and how to react and emphasised implicit assumptions. Appendix IX identifies the variation in explicit and implicit approaches through cross case comparison. Here some examples of how implicit elements are present in CI can be seen in the adoption of non-systematic patterns in how information is accessed for analysis planning and in the CI communication flows. In the findings of this PhD study, analysts following firm-centred approaches did not identify a standard analytical toolbox – instead, analysts emphasised a need for flexibility, the experience they already had in choosing analyses. For instance, the strategic analyst of Swisscom explained their systematic ad hoc approach for information flows using detached systems to mainly retrieve information in the past.

*“So my opinion is that there is **no specific concept**, there is a certain systematic approach of course but this is not a magic or clever process you use your communication to distribute your information and also you will be **happy to get feedback** from the receiver of your information.”* (Analyst 1, Swisscom, date of interview 12/02/2010)

He reported a flexible but not predefined approach. He said:

*“So, important is that this is a **flexible process**. It should not be a process, which is very difficult to handle and is time consuming. It should be **simple and effective.**”* (Analyst 1, Swisscom, date of interview 12/02/2010)

The analyst seemed to treat all competitor issues and CI on a selective case by case basis with limited use of systems. He made analyses, assessments, and recommendations. Information flows were neither described in a process, nor concept, nor structured. Mainly informal information flows occurred for competitor observation:

*“One can say ad hoc information flows ... people give **assignments** to others ... But these are... **not standardised**. It is just that there is one team, which they know they can fetch this information.”* (Analyst 2, Swisscom, date of interview 14/04/2010)

The project manager gathered and distributed information within the strategy team (directed information flows) as the analyst explained:

*“There are **processes for product development**, which are very much systematic. There are milestones for certain points, which are amended with certain documents. At projects, there is a lot of information requested about the market, the competitors to be collected, which is tightly directed. But how this information is collected is not directed.”* (Analyst 3, Swisscom, date of interview 14/04/2010)

The other analyst completed:

*“Depending on which state of decision one is, information already flow inside, but this is **directed by the project manager** obtaining the respective information at the relevant places and within this process they are carried over to the boards. Standardised processes in this sense do not necessarily exist for information flows.”* (Analyst 2, Swisscom, date of interview 14/04/2010)

Thus, Swisscom did not have systematic information flows – CI assignments were query based, limited by time, and not standardised. At the central strategy team and in some departments everything was project-based.

Sunrise’s analyst also reported no systematic information flows; she communicated competitor information directly to concerning parties, but specific information needs were discussed within their *Jour Fix*. The analyst explained:

*“It’s discussed whether a **specific competitor information** is needed.”* (Analyst 4, Sunrise, date of interview 01/10/2010)

Even though Sunrise did not have processes for communication, they engaged in ongoing discussion of competitor issues, through regular meetings.

Orange’s analyst reported a centrally steered knowledge management adoption process, which runs for all projects and initiatives with money involved, but within that system, he explained that no formal decision process was in place:

*“We have **an internal process**, which is kind for own **projects**. You have to submit / describe your action the why and the how – all projects and initiatives go through this adoption process. So there is **no formal decision process**, no formal information flows ..., it is more on a **gentleman basis**.” And: “For the recurring stuff ... it is **more a process**.” (Analyst 5, Orange, date of interview 20/10/2010)*

Communication involved internal sessions with discussion of competitor impact at different levels of management, but all aspects of network coverage activity happened via the Internet to communicate between Orange’s 80 sites. The analyst explained:

*“Yes this can take all the forms (phone, group meetings, etc.). Yes, I mean before it goes to the senior management there is of course an **internal session where we kind of discuss** how this is going to impact and how this is treated on different levels of management.” (Analyst 5, Orange, date of interview 20/10/2010)*

For Cablecom, implicit approaches occurred for projects. For recurring issues they had processes for information flows but irregular decision processes were treated ad hoc. There was no formal decision process (ad hoc). Cablecom’s operative analyst explained his approach:

*“Actually the competitor information is connected and prepared as a PowerPoint file by me and then I send this out to the senior management and to part of the middle management just to **inform how we compare to our competitors’ development in the last three months**. That’s it and sometimes I get feedback and sometimes not.” (Analyst 6, Cablecom, date of interview 10/11/2010)*

He reported a processed approach, but no further elements of his communication processes. Table 5.8 summarises explicit and implicit approaches in the firms.

Table 5.8: Summary of Explicit and Implicit CI Approaches of Firms

Firm analyst Issue	Swisscom strategic analyst	Swisscom department and strategic analysts	Sunrise strategic analyst	Orange strategic analyst	Cablecom operational analyst	Cablecom strategic analyst
Explicit Approach						
Use of Information systems	Data warehouse, limited use	Systems, Portals	Knowledge Management with data warehouse solutions, MS Office	Systems, portals, process	Clarify and MS Office Excel	Systems, Portals, process
CI Organisation	Decentral		Central	Central for Orange, decentral for headquarter	Decentral	
Implicit Approach						
Ad hoc or process	Systematic and ad hoc	Mainly ad hoc	Ad hoc and structures	Adoption process	Systematic and ad hoc	Project process
Feedback	Invites for feedback about sources	Get feedback about sources and analyses	Invites for feedback about sources and analyses	Invites for feedback about analyses	Gets feedback about sources and analyses	Gets feedback about process

The presence of explicit or implicit approaches varied across firms – headquarter-centred firms appeared to adopt more explicit approaches when building a CI structure. Following this logic, it is not surprising that Cablecom was more explicit through following headquarters systems and being managed strongly by a central team. In contrast, Swisscom had decentralised CI teams, a firm-centred structure and had analysts who networked strongly – all indicative of a more implicit approach. Although Sunrise was in a development stage in terms of CI, the company showed ad hoc elements, perhaps linked to it being firm-centred. Variation in form of knowledge conversion that comes with an implicit approach is evident in the emphasis within CI teams at Sunrise and at Swisscom on developing more network linkages and engaging in more ad hoc communication. For the firms with developing CI processes, both Orange and Sunrise have to ‘invite’ feedback, which suggests less interactivity in their relationship with internal departments/clients.

5.6 CI Content and CI Synthesis: Variation in Scope of CI Analysis – Strategic Lens

This section first investigates CI Content with a focus on the approach taken by each firm toward *identifying and gathering appropriate data*, and *setting the scope of data analysis*. In terms of data gathering and identification, in Section 5.6.1, the focus is on how each firm identifies and selects their key indicator data in order to counter competitive threats or to take advantage of market opportunities. Section 5.6.2 analyses findings in relation to the scope of analyses used – whether static or dynamic, with future and present time horizon; whether focused on comparative or priority setting purposes (as explained in Section 3.4). Finally, the variation between comparative and priority setting analyses is outlined in Section 5.6.2.2 and the analysis processes of the firms is evaluated. Second, this section considers how analysts contribute to decision-making and how they perceive information systems as supporting this task. In the first instance, the information systems perspective is addressed by examining how analysts see the existing systems in their firms supporting their CI analyst tasks (Section 5.6.3). Secondly, the variation of communication and feedback in analyst roles are analysed with a focus on their explicit and implicit role development (Section 5.6.4). Thirdly,

there is consideration of how the nature of CI projects demands different forms of CI support (Section 5.6.5). The section closes by showing how the variation in CI focus shapes the nature of CI support needed for decision making (Figure 5.3).

5.6.1 Data Gathering and Data Identification

Keszey (2011) analysed environmental scanning and analysts' attitudes. He recommended using trusted sources and specific problems and not rumours and general scanning. It is worth considering this in the light of Swiss telecom analysts approach to the selection of key market and competitor indicator data. The respondent of Swisscom explained his way of gathering data.

*“As a competitive analyst you start your day with **screening** the press, so what is particularly new in your industry or from your competitors in the market. So this is what you usually do in the morning until 9 o'clock the latest, and then ... you start your actions based on that, you look at other information sources for instance at **business reviews** from your competitor, quarterly reports, or annual reports. You read carefully the reports and then from this information you collect information about a certain **action of the competitor**, for instance new product launches ... within the next three month or so.”* (Analyst 1, Swisscom, date of interview 12/02/2010)

The respondent seemed rather excited about his data gathering process, he emphasised that his scanning procedure consisted of two steps, namely to get an overview by reading the press (less trusted sources), and then reading reports (trusted sources). Analysts 2 and 3 had a fierce discussion about data gathering processes demonstrating that data gathering and alerts was important to them and that an international perspective was important:

*“On the one hand alerts from the market, on the other hand trade register entries, if there are new firms, further building licences or building petitions for mobile wireless antennas, further employees giving us feedback whenever they hear or see something. What also occurs is that for example at frequency licence auctions one looks, who is bidding, and to whom the licence goes. These are long-term issues especially at **licence** auctions... But this serves very well as an early warning system.”* (Analyst 2, Swisscom, date of interview 14/04/2010)

“As an amendment from my view, an early warning system is the stock price developments or other events for example rumours from the stock market, or in general what happens in the sector globally or in the European market. Often there are certain trends that start in other countries with similar structures so one can conclude this happens sooner or later in Switzerland as well. One looks at it from the technological side or has external sources analysing the latest

technologies and trends. So one can see what comes from the technological side as a threat or chance.” (Analyst 3, Swisscom, date of interview 14/04/2010)

“Exactly ... for example if there are corporate competitors globally or Europe wide active markets one looks a bid **outside of Switzerland** to learn which are their offers within the market or new services not yet available here..... activities the sector are monitored. The Swiss market is too small to give impulses for the whole sector globally.” (Analyst 2, Swisscom, date of interview 14/04/2010)

They identified alerts from the market, and stock price developments as scanning sources, and looking deeper at other - similar markets to predict own market changes.

Also the respondent of Sunrise was excited about their indicator data when stating:

“For example we are in the telecommunications business and if one of our competitors wants to move into a new technology, this might be a danger for us, if we are not competitive without that **technology in the future** and therefore I think this will be important as a kind of early warning indicator that we should think about also investing in that kind of technology. [We observe new entrants through trade register entries] what might have an influence to our competitive **positioning** in the future and therefore we also include this kind of information. So it’s not only current competitors it may also serve for future competitors.” (Analyst 4, Sunrise, date of interview 01/10/2010)

She was concerned about current and future competitors. Her focus seemed new technologies used by other competitors. Concerning their sources, she stated:

“Regarding the competitors’ sources in 90% we rely on the **public available** presentations, reports issued by the competitor itself. And those reports are subject to international requirements for example if they publish an annual report this is more or less subject to IFRS, ...we have a critical view regarding analyst opinion and then we prefer some kind of other **market analyst**.” (Analyst 4, Sunrise, date of interview 01/10/2010)

Thus they seeded reliable sources of information, even though company reports could be out-dated. Due to their organisational structure they had just one central CI analyst team. She emphasised the advantage of that by stating:

“I think it’s a great advantage to have one point of contact where you can get in contact and tell this contact this information regarding the competitor A, B, or C and can you provide us with some analysis presentation. Do you have certain information, and I think the big advantage is to have one **consolidated source**, which can always change, but it’s more secure than to rely on several sources, and I think it’s more reliable because ... if you have it centralised, it’s secure you are working on it, compile the information, analyse it.” (Analyst 4, Sunrise, date of interview 01/10/2010)

Comparing with the fierce discussion held in Swisscom about having good quality information, it appears that Sunrise’s central structure has the disadvantage of lacking different views.

Orange's analyst, who was also in the position of doing CI analyses centrally stated:

*We have lots of sources for information **mostly publicly available** information. We rely on these sources. We usually get the first partial information typically on **sales and panels** where you get sales data from various channels. The work of standardising and guessing what is the missing part, the direct sales – the sales from direct channels for example from a Sunrise shop – that is based on **guessing** and on the published annual reports. (Analyst 5, Orange, date of interview 20/10/2010)*

He mentioned reliable sources and the part of guessing and figuring out, which appeared for him important for data analysis. Cablecom's operative analyst stated:

*“All indicators we have is of course market **share** that we can compare four times a year with all the digits available from our competitors but we know our budget and we compare on a daily or weekly or monthly base our performance versus budget or versus forecast and that not only in terms of gaining customers also the churn, and customer satisfaction.” (Analyst 6, Cablecom, date of interview 10/11/2010)*

In contrast to this, Cablecom's strategic analyst focused on several sources stating:

*“Cablecom uses a **variety of sources** and uses them on the one hand on a **systematic way** and on the other hand on a spontaneous manner. This means that we have a competitive review process, where we systematically gather all the information that becomes publicly available from competitors as Swisscom, and Orange. We gather this on a Swiss platform for the Swiss market. The publicly available sources are annual and quarterly reviews. There is also the **ad hoc approach**, where we find information from a **variety of sources**, these include for example newspaper articles, information gathered at congresses, conferences, individual **rumours**, stuff that comes from the market, chat between individuals. These are much harder to consolidate into a form.” (Analyst 7, Cablecom, date of interview 29/12/2010)*

Cablecom's executive assistant added:

“Another example for ad hoc monitoring is the product launches, we receive public information about product launches from competitors, and we compare these on an ad hoc basis.” (Analyst 8, Cablecom, date of interview 29/12/2010)

They differentiated between the spontaneous and the systematic way to monitor. Their spontaneous way appeared less effective according to Keszey (2011), but their discussion showed that they thought much about data gathering. Orange's analyst used a set of sources and had his way to collect data and provide information. In contrast, Swisscom and Cablecom reported a variety of sources and a broad range of market and competitive movement data.

5.6.2 Scope of Analysis

5.6.2.1 Static to Predictive Analyses

The findings from the interviews are presented below in terms of static versus predictive analysis, comparative elements, and priority setting approaches. All analyses have in common that they offer some perspectives for decisions but there is variation in the degree to which priority setting features in the competitive intelligence analysis of each firm. *Static analyses* include SWOT, five forces etc., which are relevant in identifying opportunities and threats from the market. *Predictive analyses* are scenario analysis or statistical data analysis used to predict competitor's moves. Scenario analyses aim to describe possible future markets, similar to statistical analyses that employ various models in order to extrapolate their future directions. Predicting competitor moves enables firms to estimate competitor's next actions.

For Swisscom, analyst 1 indicated Five Forces in the checklist; Swisscom's analysts 2 and 3 identified several analyses, which can be explained by the CI team having more members. Swisscom's analyst 2 did note a more systems based analysis:

*"Some are fan of the five forces model of Porter; others prefer to make analysis with the **management model of St. Gallen**, where an economical system can be portrayed."* (Analyst 2, Swisscom, date of interview 14/04/2010)

Asking Sunrise's analyst, she identified a range of ideas, but no frameworks:

*"Whenever we make a study regarding the competitor we start with the basics. We make **financial** analysis of the past year or of a certain period on a quarterly basis for example, then we also include the operational components of those companies, and look at some kind of organisational setup. We have a look at what kind of systems do they have in their network"* (Analyst 4, Sunrise, date of interview 01/10/2010)

Sunrise investigated technological and financial competitor activities. Other static analyses were not mentioned. Orange's analyst identified the use of SWOT on occasions, but did not note other analysis tools, but mentioned their own internal frameworks. Cablecom's operational analyst explained the operational analysis approach:

*"Cablecom uses all the information, which is available through the **Internet**, annual or quarterly reports from our competitors in Switzerland and combines this information with **internal information** to a quarterly competitor update with market **shares**."* (Analyst 6, Cablecom, date of interview 10/11/2010)

The interview with Cablecom's analysts 7 and 8 provided more insight into their approach. The interviewees explained:

"Yes, our analytical approach is shared to all levels." (Analyst 8, Cablecom, date of interview 29/12/2010. And: *"It actually has been adapted. It is not called **SWOT** any more; it is called **SFOT** (Successes, Failures, Opportunities, and Threats)."* (Analyst 8, Cablecom, date of interview 29/12/2010)

The strategic analyst further confirmed that SFOT is a process used by everybody. Other models were not actively discussed.

The *predictive* analysis at Swisscom was reported as an ad hoc approach to predict competitor moves in the past. The strategic analyst stated:

*"Make statements as: 'this will happen and this is an action we **expect of the competitor** in the next three weeks', then 'this company will buy this company'."* (Analyst 1, Swisscom, date of interview 12/02/2010)

Swisscom's analyst 1 noted that scenario analyses was done only on demand.

Swisscom's analyst 3 used scenario analysis more often in 2010 when stating:

*"These can be questions concerning how the situation in the **Swiss market will develop**. For example, various **scenarios** can be compiled and then presented to the board of directors. These are not just scenarios but also **recommendations** how to act, which can be derived from it."* And: *"It is good to have a good basis of what the competition has done in the past. On this basis the scenarios are developed."* (Analyst 3, Swisscom, date of interview 14/04/2010)

Thus Swisscom developed scenarios on the basis of competitor information. Sunrise's respondent explained their predictive analysis approach as follows:

*"For example whenever they include **new members** in the management team or new units, we can also identify that they might go into new **topics**, for example, if a competitor includes a kind of new management team member for innovation, so we know that they are going for new services or creative solutions in the market, which leads us to certain assumptions concerning their strategy."* (Analyst 4, Sunrise, date of interview 01/10/2010)

Even though Sunrise's analyst did not identify an explicit predictive analysis, her example shows the attempt to predict competitor's moves. Orange's analyst identified own firm frameworks:

*"We also have **frameworks**, which we have defined internally, which cannot be revealed. This is where we look at different aspects of the business, and then we try to **map things and activities**, so we have internal ways to represent competitor activity, competitor positioning, it's more than **guessing** and trying to analyse what **future moves** could be."* (Analyst 5, Orange, date of interview 20/10/2010)

Cablecom's analyst 6 identified a 'traffic light approach', which has the aim to alert. He explained:

“If it is all red you have to act quickly. The underlying information is the actual performance of all our work like customer acquisition, network status, service levels, customer care, how many calls can be served at the first time, the average call duration, all this kind of stuff, which can be measured, and if this goes in the wrong direction there is action.” (Analyst 6, Cablecom, date of interview 10/11/2010)

Asking him if they had a similar approach for external information he added:

“That is kind of daily product management work to know what our competitors offer, what the news about technology is, what technology they trying to do, that we have to gather anyway, it is part of the LRP (long run plan), because changing technology is not done in a few months easily on a network, it is heavily investment associated.” (Analyst 6, Cablecom, date of interview 10/11/2010)

He further confirmed that they used an ad hoc approach towards external information.

They regularly analysed changes from customers’ views as the strategic analyst confirmed later:

*“This **program of change** involves individual products, in fact all major processes people engaging for the customer... all these improvement projects for customers ... these are measured through green, orange, or red lights. We are tracking these [changes] every week for the entire program to see if things go up or down and also to see, if colours change from red to orange, or from orange to green or not.”* (Analyst 7, Cablecom, date of interview 29/12/2010)

Cablecom’s analysts 7 and 8 did not discuss scenario analysis, which indicates that they heavily relied on their ‘SFOT’ approach. They focused on customer analyses, as the strategic analyst explained:

*“We are doing more analysis of what our **customers** are perceiving, what customers are thinking about Cablecom, how processes work or don’t work for customers, today the organisation reacts and changes whatever is needed or becomes apparent based on the information from analysis of customers.”* (Analyst 7, Cablecom, date of interview 29/12/2010)

While Swisscom’s respondents could list an array of differing analysis approaches, Sunrise’s respondent tried to predict competitor moves. Orange’s respondent explained how internal frameworks helped to predict competitor moves as it included mapping situations. Predictive analysis was not explicit in Cablecom – but was implied in some of the market analysis noted, although informal. Only Swisscom noted the international perspective as direct input and adopted scenario analysis. Orange and Cablecom used analyses from headquarters which would be regarded as static with a focus on assessing past and current trends.

5.6.2.2 Comparative and Priority Setting Analyses

In considering comparative elements, it is useful to identify elements of benchmarking as a continuous process of comparing the own with competitors' practices and procedures. Best practise approaches are relevant as to compare the own performance in relation to optimal practise of competitors. The strategic analyst of Swisscom explained his competitor analyses for the board of directors in the past.

*“It is a description of the **competitive market**, who is acting in this market, who has access, lets say **market share compared to other markets**, a kind of a benchmark, for instance the German market, developments in the industry in general, and in particular for the Swiss market.”* And: *“In regard to strategy, we observe other markets and we do some **benchmarking** compared to our own market, and this could also be part of the strategic decision-making process.”* (Analyst 1, Swisscom, date of interview 12/02/2010)

Swisscom's analysts sometimes worked in project teams, and benchmark analyses were made about the European telecommunication market. The respondent said:

*“For example when I do a **benchmark** about the European telecommunication market I take certain digits and then I notice the data deliverer is not that good, I look, if there are other sources to provide the data.”* (Analyst 3, Swisscom, date of interview 14/04/2010)

In contrast Sunrise's respondent did not make own benchmark analyses. She explained:

*“Sometimes we also include some kind of **benchmark opinions** for example we also include within our analysis certain opinions from other market research institutes or market analysts when they have a look at our competitors.”* (Analyst 4, Sunrise, date of interview 01/10/2010)

Benchmark opinions are secondary sources. Contrasting to this Orange's analyst used data from their headquarters for their benchmarks:

*“There is publicly information, they **benchmarked** the global operating networks, so all the analysis following that survey was done by the people specialising on the sales informants, all those people that are specialising in sales”.* (Analyst 5, Orange, date of interview 20/10/2010)

Cablecom's operational analyst benchmarked performance against competitors, where competitive information was based on market assumptions. The respondent explained:

*“[We do benchmarks] ...when it comes to network status, how many headsets or how many parts of the network, as we promised, how much of the network is underperforming, where we have too much bandwidth available, that one of course we compare of how the networks of all our competitors is behaving. That is then a **benchmark** kind of a thing. The rest is ... compared to what we think we should achieve, first of all versus **budget**, and then how we performed comparing to our **competitors**.”* (Analyst 6, Cablecom, date of interview 10/11/2010)

Benchmarking is about comparing with others and goal setting (Boxwell 1994; Wagner *et al.* 2006). O'Brien (2011) investigated the use of advanced tools to support the management process (for example financial analysis, multi-criteria decision analysis, simulation, statistical analysis, benchmarking, influence diagrams). Only Swisscom provided their own benchmarks concerning strategic goals, which underlines its forerunner position. However, we can see from the quotes above that benchmarking was part of the analyst task. Although there were some benchmarking elements in CI Content the respondents did not report best practise approaches, but firms appeared to constantly monitor each other and to evaluate their services. It is noteworthy that the telecom firms can access studies about benchmarking about the European telecom market (EUTC 2015), and Swisscom did a benchmark in 2013 reported in their annual report (Swisscom 2013f).

Priority setting analysis aims to identify what is important and to set priorities. As a basis for priority setting, first analysts evaluate preconditions, and derive decision alternatives. Then they describe the alternatives and give a recommendation. The respondents identified recommendations and priorities as pattern of priority setting analyses. Swisscom's respondent explained his priority setting analysis step as follows:

*"You can also write down recommendations for management how to make decisions, what you **recommend** management should decide from your perspective."* (Analyst 1, Swisscom, date of interview 12/02/2010)

He did not further detail his priority setting analyses. The other respondents explained:

*"There are ad hoc assignments answering questions and it can go that far that they also result in giving **recommendations** how to act."* (Analyst 2, Swisscom, date of interview 14/04/2010)

The respondent identified priority setting for projects when stating:

*"There are certain queries or projects, which are **prioritised**, so called key projects, which get more resources than other projects, as they have the highest priority."* (Analyst 2, Swisscom, date of interview 14/04/2010)

Sunrise's respondent explained that they did not have a process to set priorities, but held weekly meetings and regular workshops to discuss and work out what to recommend within the strategy team.

Orange's analyst 5 explained their approach as follows:

*“That is more of a decision-making process. If you as a division, as a team manager, you want to know something, you come along with recommendations. That is usually done under a presentation mode. You want to go there you have three options we **recommend** one. That would be the modus operandi typically.”* (Analyst 5, Orange, date of interview 20/10/2010)

Cablecom Analyst 6 explained that they analysed financial data to support decisions:

“You know what you are able to put on effort for the next year into the customer acquisition and then you have to come up with a realistic budget. We have to put this as well in our budget evaluation....”

“It is part of the information for decision-making or it is part of the information used to elaborate the long range plan and to come to a budget for the upcoming year.” (Analyst 6, Cablecom, date of interview 10/11/2010)

Cablecom Analyst 7 looked at decision making for projects when stating:

“What is done is a form of a defining the use and the value of particular projects, and analyse it in a hierarchical form.” (Analyst 7, Cablecom, date of interview 29/12/2010)

He detailed how they set priorities when stating:

*“Financial terms based on their capital expenditure (CAPEX) and operational expenditure (OPEX) in terms of their pay back, which is a logically important criterion, and also soft criteria like image, brand, customer satisfaction. And based on these criteria we review all projects, and put them on a **prioritised** list, which means that some already fall out because they are not good enough ... the remaining projects should be done, like in 1 – 3 years.”* (Analyst 7, Cablecom, date of interview 29/12/2010)

Setting priorities appeared to be so important for Cablecom that they had a detailed process for it, as Analyst 7 explained:

*“The outcome of the **prioritisation** process of project reviews for example is largely **communicated through formalised meetings**, ... where project solicitors need to show their projects during the meeting. For example there is the regular project prioritisation board meeting... .”* (Analyst 7, Cablecom, date of interview 29/12/2010)

The researcher examined each approach in terms of whether primarily static or dynamic in scope, whether internal or external in focus, in order to track the direction of the firm analysis in terms of market and competition. The main weakness of the firms was a lack of dynamic analyses to support or evaluate market development decisions. In considering Figure 3.2, no firms occupied the position of being fully dynamic in scope of analysis. Only Swisscom undertook scenario analyses, which is a resource intensive process but allowed them to gain peripheral vision on their market and identify possible upcoming changes. What emerged is a distinction between headquarters-based analysis

tools and more adaptive, more ad hoc CI analyses that combine techniques. Table 5.9 summarises the analyses applied by the respondents.

Table 5.9: Scope of CI Analyses applied in Firms

Firm \ Analysis	Static to Predictive	Comparative	Priority Setting
Swisscom Analysts used a rich array of analysis tools and provide their own scenario analyses (for telecom specific topics such as fibre net).	SWOT, five forces, management model of St. Gallen, predict competitor moves, scenario analysis	Benchmark competitive / telecom market	Recommendations provided ad hoc, from key findings, prioritising of key projects
Sunrise Analysts participated in strategy process and regular brainstorm meetings. A merely ad hoc approach is dominating along with the interaction within management meetings.	SWOT, predict competitor moves	Benchmarks from research institutes	Ad hoc approach, useful brainstorm at weekly meetings
Orange Analyst applied a company-wide framework with “levers”, which was internally defined. Headquarters provided analysis framework (some sophisticated) butt not tailored to the market.	SWOT, framework, predict competitor moves	Benchmarks from headquarters	Link to Decision making process seems limited – mostly top down
Cablecom Analysis approaches are shared at all levels, using company-wide analysis tool. This appears to work, but analysis level is basic. Cablecom Switzerland provide tailored analysis techniques, although no modelling	Adapted SWOT: SFOT, customer analysis	Benchmarks of technologies	Focus on forecasting for finance and customer system-some priority setting processes

5.6.3 Perception of how CI supports Firm Decision Making

Information systems are tools to support decision-making. When asking analysts during the interview about their support for decision-making, a range of perspectives emerged Table 5.10 offers an overview of their self-assessment. Their examples demonstrate that their main focus was to monitor direct competitors (product, service and price changes, investments and other competitor actions) which directly influenced their own products and services. Thus, there appeared a short term focus in the nature of decision support.

Table 5.10: Self-assessment of Analysts on Decision Support Actions in Role

Firm's Analyst (q13)	Examples of Decisions with CI Input
Swisscom 2010 strategic analyst	React to a new price strategy of competitor
Swisscom 2010 department analyst	Evaluate and implement the launch of a no frills product for the mobile market
Swisscom 2010 strategic analyst	Evaluating the launch of a low cost brand for the broadband market
Sunrise 2010 strategic analyst	Investment proposal (technological)
Orange 2010 strategic analyst	Recommendation using a certain tool for measuring customer satisfaction (interviewing mode, net promoter score (NPS), Bain consultants, Wikipedia). Then decision of Management board and implementation.
Cablecom operational analyst	N. A.
Cablecom 2010 strategic analyst	Develop new, improve existing services
Cablecom executive assistant	N. A.

Looking at this for each firm demonstrates variation in scope or support that the CI analyst offers for company decisions. Swisscom's strategic analyst explained past and present approaches:

*“In the context of **decision-making** usually people have a strategy development in projects and CI will be part of the projects. Usually in a documentation, you have to make as an outcome of this project a final report, and your contribution, the **CI contribution**.”* (Analyst 1, Swisscom, date of interview 12/02/2010)

The analyst contributes to decision making by providing relevant CI information.

However, another analyst noted how this was changing, highlighting a more organic approach:

*“In the earlier days, comprehensive strategic reports / presentations were written. Today this is merely done in a query-based form. Certain strategic questions are cleared up with different strategic tools. This happens at the corporate level of Swisscom, but also for certain departments or subsidiaries. These **questions are very concerned with the competition, with the market, and within this frame, all the collected information flows in. Our strategic department replies to these kinds of questions and we access the concerning people and tell them how get the information. Then they become active and search the information. They can do this through the portal, if this is about general issues, or if there are **specific requests, these are ad hoc requests.****”* (Analyst 3, Swisscom, date of interview 14/04/2010)

Decision-support occurred through a lot of information flows and through referral to sources for internal customers, with a strong focus on specific issues from the market. Even though analyst 3 was very enthusiastic about the improved decision support, he did not use information systems, just human decision support, while analyst 2 indicated

in the checklist the use of competitor information system and management information systems in support of decision-making. In a similar way, the Sunrise analyst did not identify information systems for decision-support. She explained:

*“With our competitor market intelligence we are **part of the strategy team** and for example we have a jour fix every week and within that kind of jour fix we talk to each other, who is working at which project, are there any problems we have to solve, and there it’s discussed whether a specific competitor information is needed, we make workshops where we talk about this whenever a new strategy roadmap has been worked out. So the person who is responsible in different teams come together and talk about the problem and then also **competitor information is included**, described, presented, and we make a kind of brainstorming how this will be important for our strategy decisions but it’s not a constituted process.”*
(Analyst 4, Sunrise, date of interview 01/10/2010)

The approach is organic, with a lot of informal but focused communication and feedback occur. By indicating that MS Office using Excel spread sheets as the only real decision support in the checklist, she reinforces the view that the expertise of the analyst was the more important aspect. Orange’s analyst commented on using frameworks, but felt that it was not a system.

*Can we call it a system? It’s more an **approach**. A system for me looks like a big machine, where you give input, and you get some output. It is not as rigid as that, it is based on that strategic framework that we have and which we use. So, is it a system? No, it’s a framework. Also in an informal way, whenever you are in an audience and you are presenting something, the link is also done on an **informal way** by the people. About the formal I am not allowed to tell.* (Analyst 5, Orange, date of interview 20/10/2010)

The lack of reference to information systems as a direct support for decision making was significant and perhaps surprising. Systems were supportive of data management but not seen as enabling the development of actual decision alternatives. This might link to the scope of analyses that are being undertaken – with a predominance of static and comparative analyses and a lack of predictive analysis techniques being undertaken that might offer more sophisticated decision support. An interesting difference of opinion on decision support occurred in Cablecom interviews. Cablecom’s operational analyst described a short term routine in decision-making where his role was CI data output for management. The strategic analyst, in contrast, explained a process that was strong in decision support. Both are set out in Table 5.11 below.

Table 5.11: How Perceptions of Decision Support vary across Analysts

Cablecom Operational Analyst Concrete on input to continuous activity. Sees strategic decisions as at higher level	Cablecom Strategic Analyst Strategic thinking evident Sees decision process as major project
<p><i>“I send our competitor information to part of the middle management and to the senior management, and there are of course some regular meetings, based on these meetings we have some decisions, which is not at the end of the day strategic, it is more or less updates, actual decisions what we should do in a couple of weeks / months, to react to the development of the market. The other one- the competitor information is much more in terms of technology, in terms of widening out the footprint compared to our competitors, it is also not a formal process, there is no process for how to react if Swisscom is rolling out the fibre network. This happens once in 10 years time and therefore it is no formal process. If the information is popping up somehow then it will go to the senior management, and then we will have a strategic decision on how to react. That is also much more driven by the colleagues in the strategy department I would say”. (Analyst 6, Cablecom, date of interview 10/11/2010)</i></p>	<p><i>“We use information gathered on the competition. Strategy is concerned with projects of major impact. For example, if a competitor enters into a new area, that Cablecom currently does not provide, we need to see in the strategy review, which business strategy plans needs to respond. Cablecom will need to ask the question, how we provide that service, if we should not provide it... So if a product, a service is launched in the market by a competitor, ... we assess if the market really needs that kind of product or service, so we decide that we start to offer or develop a similar service but differently. These are major projects. As soon as the competitor has launched it, a project to develop on our side will take a long time, [a year or longer], the sooner we know about competitor developments, the earlier we react, this involves decisions on a strategic level,</i></p> <p>(Analyst 7, Cablecom, date of interview 29/12/2010)</p>

5.6.4 Communication and Feedback in CI Analyst Role Development

From the analyst viewpoint, explicit processes were balanced by the value they noted in ad hoc communication. Swisscom analysts appeared to emphasise implicit approaches, noting how ad hoc ways communication enhanced *role development*. While explicit approaches enabled alignment with strategy, implicit approaches seemed to emphasize greater learning and development. This is in line with the assessment of the Association for Strategic Planning (2014), in which they noted how feedback and learning are necessary to promote continuous improvement. What was called *deliberate feedback* was seen as important to improvement at Swisscom. Table 5.12 shows patterns of analyst role development and its associated emphasis on feedback.

Table 5.12: Importance of Liaison and Feedback to CI Analyst Role Development

Respondent	Key Comment	Role Implementation
Strategic Analyst 7, Cablecom, 29/12/2010)	<i>“The outcome of the prioritisation process of project reviews for example is largely communicated through formalised meetings.”</i>	Inbuilt strategically oriented meetings
Operational Analyst 6, Cablecom, 10/11/2010)	<i>“[At] middle management meetings ... there are questionnaires you can fill in how it was, the timing, the themes we discussed, the topics, the right topics and the right tool to act on this topic, and you can give overall comments on the setup.”</i>	Inbuilt operationally oriented meetings
Analyst 6 Cablecom 10/11/2010	<i>“If you make a request, first of all design me a new promotion, then you have to talk to IT because they have to design and implement the systems, ... then you get immediately feedback ... If you are not satisfied with this, you have to escalate this to change your priorities if necessary.”</i>	Link between feedback and escalation of issue to another level
Strategic Analyst 2, Swisscom, 14/04/2010	<i>“Employees giving us feedback whenever they hear or see something, or may be even when they received a call from a market research firm learning there is a new product from a competitor”</i>	Deliberate Feedback
Operational Analyst 6, Cablecom, 10/11/2010	<i>“[At Etouch we communicate] somehow flexible, ... interactive, where we ask question where we develop part of strategy, make proposals on how to act in the market.”</i>	Inter active, ad hoc feedback
Analyst 5 Orange 20/10/2015	<i>“We have a team, who is basically specialising extracting our data usage patterns, all patterns.” And: “Before it goes to the senior management there is of course an internal session where we ... discuss how this is going to impact and how this is treated on different levels of management.”</i>	Liaison with different levels of management
	<i>“We have a jour fix every week ... [we] talk to each other, who is working at which project, are there any problems we have to solve.”</i>	Liaison and continuous Problem solving

5.6.5 How the Focus of CI influences the kind of CI support needed

Swisscom’s analysts identified CIS and MIS, but their role was to structure and store relevant decision support data. The strategic analyst of Swisscom indicated that a limited analysis toolbox was in use and basic analysis tools are also in use in other firms, Sunrise’s analyst only used MS Office for decision support and the Orange analyst noted no information system, only frameworks were used. In conclusion, the information systems were a supporting tool but the analysts did the main work – all

firms believe that the analyst was central and that it was human decision support that was most vital for CI as decision support in firms. During the interviews all analysts other than Cablecom’s executive assistant explained that they used only human driven decision support (see Table 5.13).

Table 5.13: Self-assessment of Analysts on Nature of Decision Support

Firm’s Analyst	Set priorities	Weight alternatives	Evaluate preconditions	Influence decisions
Swisscom 2010 strategic analyst	CIS, MIS	CIS, MIS	CIS, MIS	Somewhat to very much
Swisscom 2010 department analyst	CIS, DSS	MIS, DSS	CIS, DSS	Somewhat to very much
Swisscom 2010 strategic analyst	DSS	DSS	DSS	Somewhat to very much
Sunrise 2010 strategic analyst	Other Systems (PowerPoint, Excel spreadsheet)		None	Somewhat
Orange 2010 strategic analyst	None	None	None	Somewhat
Cablecom 2010 operational analyst	I do not know	MIS	I do not know	Very much on analyses
Cablecom 2010 strategic analyst	DSS	DSS	None	Somewhat to very much
Cablecom 2010 executive assistant	N. A.			Very much

Acronyms: Competitor Information System (CIS), Management Information System (MIS), Mathematical Modelling System – also their own calculations (MMS), Knowledge Management System (KM), and Decision-Support System. The choice of analysis system – also their own calculations (DSS).

As identified in Section 3.8.2 on page 61, decision support consists of setting priorities, weighting alternatives and evaluating preconditions, which is arguably more than an information-based DSS can generate, as it involves analyst and management cooperation. One critical element of decision support noted by the Cablecom analyst is the number of people involved in major competitive response projects:

*“The strategic projects tend to **involve many, many people**, so, we have not only myself and my colleagues, we have IT, we have sometimes 10, sometimes 15 or 20 people in IT involved, to designing information systems we need **network**, ... because networks need to be **upgraded**, or **changed** or somehow **adapted** in a way, we need to have financial departments involved, because this requests finances, we also need to have involved corporate departments in Amsterdam or even a higher level internationally, and as soon as so many people are involved this is an enormous strain on the organisation.” (Analyst 7, Cablecom, date of interview 29/12/2010)*

This might explain the need to rely on human decision support because confidentiality becomes critical and information on a shared portal make that difficult.

Nonetheless, there is a difference in focus, in significance and in critical importance in the CI for decision preparation when looking at four different purposes of CI. In Figure 5.2, while we can see that for ongoing CI activity, active monitoring of competitive position and actions is the focus, (as in the bottom left of diagram for Sunrise example) For short term market changes (e.g product launch), a different approach is needed to enable rapid response – in the Orange case, (top left hand), this showed a strong reliance on intranet data and useable, familiar frameworks that are companywide. Findings showed that information systems offered some useful support in retrieving, organising and storing data.

When it comes to long term major projects, the level of CI activity that goes into decision support increases significantly – it becomes more intensive, it involves significant networking (as noted in Swisscom and Cablecom examples on right hand side of diagram); there is urgent strategic direction involved and large information flows involved. Both firms address major project challenges differently – Cablecom through a prolonged, corporate-level, strategic and intensive programme of CI analyses, and Swisscom through the query based planning offering a more continuous, networked CI with a broader lens of market analysis.

While findings from this study noted that basic analysis toolkits are used and the level of sophistication of the analyses seems limited to static and comparative analyses, all firms planned to expand these information systems – there was some evidence that each had included competitor analysis programmes and broader environmental scanning techniques to address some larger scale CI analysis. However, as the Cablecom analyst notes, major CI projects do not emerge every year, and the company only had the resources to address a few major CI projects annually.

Figure 5.2: Variation in CI focus shapes nature of CI support for Decision-Making

	Focus on Short Term Market Change and CI for Rapid Response	Focus on Major Long Term Projects Intensive Market-based CI
CI Projects involving Market Change	<p>“The information is completely available on our intranet. So you can know exactly at which stage of the adoption a project is.” “[For] recurring stuff, that happens every quarter or every month, every week, depends on the information, ... there is also an ad hoc dimension when there is a product launch, when there is an event such as recently the merger of Sunrise with CBC, then there is a demand for a specific quick information with presentation and discussion.” (Analyst 5, Orange, date of interview 20/10/2010)</p>	<p>“Size and level of risk for the organisation makes sure it wants to invest billions, or months, or a long time into a particular project. Based on that we cannot do 5 or 10 of these projects, we only can do 3 or 4 ... at the same time, so it is worth always to prioritise to what comes first and which of that competitive information is really relevant or important for our business, and what isn't”. (Analyst 7, Cablecom, date of interview 29/12/2010) “Cablecom’s strategy is much concerned with projects of major impact. For example, if a competitor enters into a new area, that Cablecom currently does not provide, we need to see on the strategy review, which business strategy plans it needs to respond, if and how we should react on the major change.” (Analyst 7, Cablecom, date of interview 29/12/2010)</p>
Commentary	For short term product launch, the focus is on anticipation, on quick interpretation and consideration of action	For long term market changes (disruptive), the focus is on comprehensive analysis that involves many internal actors and networks, relies on multiple data sources and involves significant consideration of alternatives decision alternatives
	Focus on Direct Competitor Analysis = CI to anticipate Competitive Moves	Focus on Broader Market-led Priorities = Integrative CI for Adaptive Market Response
Continuous, Systematic CI Activity	<p>“We can also identify that they might go into new topics, for example, if a competitor includes a kind of new management team member for innovation, ... we know that they are going for new services, which leads us to certain assumptions concerning their strategy.” (Analyst 4, Sunrise, date of interview 01/10/2010)</p>	<p>This happens at the corporate level of Swisscom, but also for certain departments or subsidiaries. These questions are very concerned with the competition, with the market, and within this frame, all the collected information flows in. Our strategic department reply to these kinds of questions and we access the concerning people and tell them how get the information.” (Analyst 3, Swisscom, date of interview 14/04/2010)</p>
Commentary	Day to day monitoring includes competitor announcements of new contracts with suppliers, regular financial analyses of competitors. Focus on their operational and technological setups.	There is constant strategic focus, due to query based CI planning. Management constantly set CI challenges for analysts (department and corporate level). Scope of CI analysis is driven by interlinked focused projects and managed through priority setting. Once launched, projects can be major/minor in scope

5.7 Summary of Chapter

The structure of this chapter followed the three lenses of analysis – operational, organisation and strategic. The analysis from the *operational lens* (Sections 5.3 and 5.4) covered key elements of CI Management (Section 5.3), which demonstrate if analysts apply structured or ad hoc approaches to deal with CI tasks. By examining how each firm has incorporated CI Quality in Section 5.4, the findings have shown elements of process effectiveness. In asking analysts to evaluate their system applications and how far they saw these as effectively supporting CI tasks (Campbell 2004), this has offered new insights into the perceived CI Quality. The *organisational lens* (Section 5.5) has identified how CI is supported and organised through analyst teams (see CI Organisation, Section 5.5.1) and noted how analysts are involved in decision making (Section 5.5.2). When looking at how information systems are utilised (Section 5.5.3) we noted the importance of both human and information systems as part of CI activity in the firms. Section 5.5.4 looked at the evidence of how firms differ at different stages of CI Process development, focusing on the variation between explicit and implicit approaches from the interview data. As Choo and Bontis (2002) have identified, CI deals with knowledge creation, transfer and utilisation as an organisational process. When CI activity is viewed as an organisational process, analysts may address it in explicit or implicit ways. It was felt that this was an important element of the findings to draw out; since such organisational patterns allow understanding of variation in CI Organisation across firms.

Throughout each section, 5.3 to 5.6, the comparative case analysis method was applied as a means to examine CI activities of the four firms were undertaken (Swisscom, Sunrise, Orange (later Salt.) and Cablecom; see Fleisher and Bensoussan 2003; 2007). The comparative analysis of the findings uses qualitative data types to explain in how CI Processes vary following the explanation of Tashakkori and Teddlie (1998):

“Each alternative component of the information ... adds to the analytic picture. Numeric patterns show ‘how many’ and comparative texts show ‘in what way’.”

By examining each key CI activity, greater insight into the emergent nature of the CI Process in Swiss telecom firms has been gained. For instance, findings relating to CI Content (Sections 5.6.1 and 5.6.2) describe how firms approach transformation of

identified market data into intelligence and how that is implemented in the case firms. This has helped differentiate between the range of predefined analyses (a company-wide approach) or patterns of individualised combined analyses that are adaptive at firm level. Additionally, how the CI process links to other firm processes (Section 5.6.3) enables us to see how analysts answer queries from management about the market and its development. This has highlighted some interactive elements, in line with Staskeviciute and Neverauskas (2008) and some internal development changes (echoing da Silva 2012). It has also thrown up some divergence between analysis procedures that are company-wide standards (Kahaner 1996) with predefined strategic directions (Wright *et al.* 2009) and those that are more flexible in scope and in purpose.

The *strategic lens* (Section 5.6) examined analysis approaches in firms in Section 5.6.1 and 5.6.2. In examining the capacity of CI to support decision making in Section 5.6.3, consideration of the strategic intent behind CI activities enabled consideration of both operational short-term CI and some insight into CI projects devoted to a strategic long-term perspective. In the next chapter, Chapter 6, we address the findings from a market context analysis of the Swiss telecom sector.

Chapter 6: Findings: Context Analysis

6.1 Introduction: Focus on Context – Strategic Lens

The previous chapter focused on analyst perception of their CI processes, concentrating on the analysis of CI activities at the level of the firm. This included the examination of findings on the CI activities in terms of the Integrative framework of CI activities view (see Figure 3.4) based on a systems perspective on CI (Association for Strategic Planning 2014; Bain 1968; Porter 1980; Pfeffer and Salancik 1978; Dyer and Singh 1998). The chapter also considered the evidence in relation to criteria for CI Process effectiveness (BABOK 2011; Johnson and Lederer 2005; Rulke 2000). A main focus was on how analyses can support management decision making – taking into account that analyses are shaped by the firm system (organisational elements). By influencing decisions, CI content was identified as core element for synthesis (Section 5.6). With a focus on analysing the context of the Swiss telecom market, Chapter 6 offers a view of the external competitive environment and how CI, through predictive levels of analysis, is relevant to understanding future market directions. This focus links to the systems view and fulfils further the adoption of the strategic lens on CI activity (Section 6.4).

The market context analysis provided in this chapter offers a coherent picture by looking at the telecom sector as a whole to identify relevant indicators for the prediction of market developments or changes (Mullekom and Vennix 2004). **Section 6.2** identifies the need for analyses that are more dynamic in scope and have a major CI project focus. **Section 6.3** gives an overview of the sector as a whole, using Porter's Five Forces analysis of the Swiss telecom market. **Section 6.4** develops a detailed scenario analysis based on data from the Swiss telecom market, which offers an external perspective on how CI could identify indicators of market direction in the sector. This analysis links to CI Content and is a means to selectively analyse and evaluate key indicators in order to analyse potential future market direction (Fink, Siebe and Kuhle 2004; Tessun 1997 and by Xu and Kaye 2009). This generation of possible scenarios permitted a time series analysis of key indicators. Frequently this aspect of CI analysis is ignored but it is relevant in this study because one of the key objectives is to understand how predictive analyses of the market can be applied in such a rapidly

changing market context. Relevant scenarios to give future potential competitive directions are generated, a main scenario and indicators are identified, which are then used to provide a five-year forecast (2010 – 2015). In **Section 6.5** the scenario analysis is applied to Swisscom to validate a forecast. **Section 6.6** discusses implications from the scenario analysis for the telecom firms.

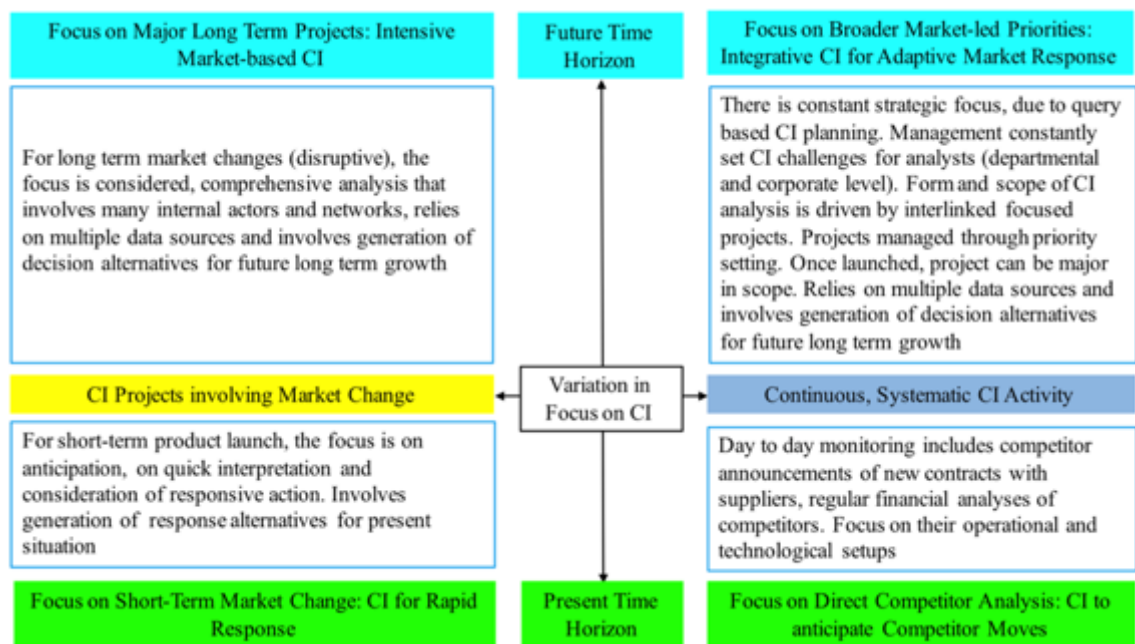
6.2 Predictive Analysis and CI Support for Future Decision-Making

As discussed in the last chapter with a focus on the three lenses of analysis, and as discussed in Figure 3.4 one element of the strategic lens was looking at predictive forms of analysis. This is now taking forward in this section.

6.2.1 CI to support of major CI Projects involving Disruptive Market Change

In Section 5.6, it was noted that the support for decision making that CI activities could offer varied according to the focus of CI, as shown in Figure 5.2. If CI was focused on continuous ongoing market scanning, or short term market changes, (as noted on the lower part of the diagram), both static and comparative kinds of analysis can generate plenty of support for decision-making. Respondents across all firms identified plenty of analyses that they were pursuing that related to continuous market scanning.

Figure 6.1: Variation in CI focus shapes nature of CI support for Decision-Making



However, where CI was focused on major projects, (as noted on the upper part of the diagram Figure 6.1 above), then more intensive, more comprehensive (with stronger external focus on market change) and more dynamic analyses are needed to generate support for management decision-making. As noted by the Cablecom analyst, these CI projects entail a lot of resources and demand significant networking capacity to generate some final decision alternatives. Thus, when we examine the nature of CI in a rapidly evolving market, which is experiencing disruptive technological change, such as the Swiss telecom market in the 2010s, we are examining a sector where major CI projects are regularly being undertaken by the key market players (in this case, the four large scale telecom firms). Disruptive technological change is now the norm across European telecom sectors and this has been accompanied by significant competitive repositioning, takeovers, mergers and corporate consolidation. The need for effective CI to keep track of simultaneous technological, competitive and market change is high. The need for CI analyses to offer support for major decisions at firm level is even higher. For decisions that are occurring in the telecom market to accommodate powerful disruptive technological change, or to anticipate / respond to aggressive competitive threats, then the focus of CI at firm level is on major projects.

6.2.2 Nature of Predictive Analysis and Focus on Future Direction

The theoretical aspects of predictive analysis were outlined in Section 3.5. Predictive analysis depends on successfully identifying relevant market indicators – analysing indicators in a dynamic market is related to the KIT perspective (Key Intelligence Topics, see Section 3.2.1 on page 27) on CI, as explained by Herring (1999). In terms of the integrative CI Activities framework adopted in this study, it is part of CI Content, which specifies data identification from either the market or the firm view for a defined time horizon.³ In this section, the identification of relevant data or indicators that could generate relevant scenarios, and the subsequent evaluation of these in relation to one firm sought to identify the strategic role of intelligence strategy. In taking account of the major disruptive technologies in the telecom sector, evaluating CI data against a future time horizon might now be seen as a necessary activity within CI.

³ The approach of this study is related to information management (Stahlknecht and Hasenkamp 2005). Lutz and Lehner (2005) identified that information management is a critical success factor for the firm.

Table 6.1: Focus of Context Analysis

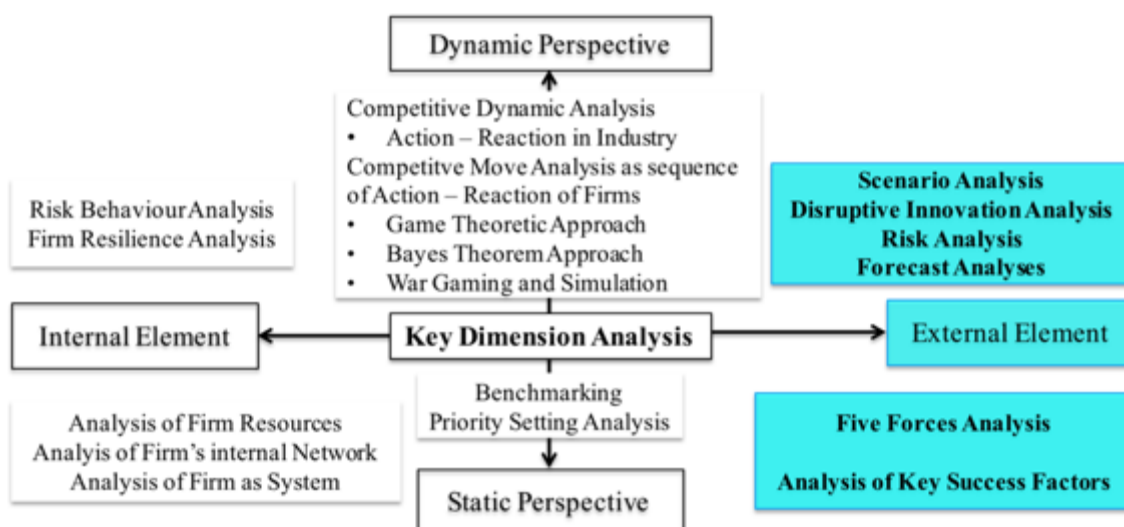
	Research Question	Focus
CI Content	How can <i>relevant indicators</i> of competition be identified from analysts of the large-scale Swiss telecom firms?	Scenario analysis as a means to identify indicators
	How does this information <i>affect</i> the <i>performance</i> of a selected large-scale Swiss Telecom firm over time?	How predictive indicators are used to evaluate how se tor forecast might influence firm performance?

In Section 3.5, analysis tools were identified and structured, as shown in Figure 6.2 (see Figure 3.2 on page 45). On the right hand side, Figure 6.2 highlights the identified external elements that are potentially part of predictive CI analyses. Within this view, Porter’s Five Forces analysis was critically appraised (Section 3.5.1) as a way to provide an external static⁴ perspective of the Swiss telecom market (static as at one point in time). CI is concerned with the identification and analysis of competitive market changes; despite the criticisms of the framework, Porters Five Forces analysis helps to identify competitive actions in the market and is used below in **Section 6.3**. The scenario analysis provides a dynamic perspective, focusing on identifying possible future competitive directions in the market (relevant for all four firms). Indicators are identified as outcomes of the scenario analysis, which addresses the first research question in Table 6.2 above – *demonstrate how to identify* relevant indicators. Using the identified indicators can provide a forecast for one firm in relation to its profit development. The specific firm in this case is Swisscom and then we can consider *how this information (the suggested forecast) might impact on the performance of the firm*.

A further dynamic analysis from Figure 6.2 is the consideration of disruptive innovation and risk. This was implicit within the scenario analysis, as the indicators identify disruptions and relevant risks. These dynamic analyses in **Section 6.4** provide insight into the future competitive direction of the sector. Implications emerging from the scenario analysis are then outlined in **Section 6.6**. The patterns arising from the scenario analysis are considered in the light of data from the interviews.

⁴ Static in the sense of being restricted to one point in time

Figure 6.2: Overview of Static and Predictive CI Analyses⁵



6.3 Five Forces Analysis of Swiss Telecom Market

Porter's Five Forces model (Porter 1998) is applied to the Swiss telecom sector to understand the market context in 2010. Even though the limitations of Porter's Five Forces model have been widely known (for example Grundy 2006) the model remains a useful way to represent the external competitive environment through a brief snapshot.

Threat of new competition: High entry barriers appear to protect the large-scale telecom firms from new direct competitors. Even if a new competitor enters the market, the firms know it years beforehand (Comcom 2010), as the competitor has to bid for frequencies and has to be allowed to bid. In 2012 Swisscom, Orange, and Sunrise paid a total of CHF M. 996.3, which is about £ M. 665 (Comcom 2012). The frequency licenses auction was announced in 2008 and, due to the high entry barrier, only Swisscom, Orange and Sunrise applied to bid (Comcom 2012). The frequencies are sold between 2014 and 2017 depending on the frequency and last until 2028 (Comcom 2010). New providers would have to offer MVNO services, as no licences are available. Indirect competitors as MVNOs, and the Internet are a threat (interviews with telecom Analysts). Apart from MVNO offers from the entertainment industry and wholesalers,

⁵ Other dynamic analyses would be potentially possible such as game theoretical approaches (Fraser 1994) to predict competitor moves, or applications of Bayes theorem (Michaeli and Simon 2008). These predictions have a short-term time horizon whereas Scenario analysis seeks at long-term time horizon.

Cablecom plans to become an MVNO by 2013 to offer mobile connections, which makes this threat quite high for the other three firms, as Cablecom did not offer mobile connections during the previous years. Even though interconnectivity is available at a rather low price, a green field approach with an own new net would be priceless. It is cheaper to buy a firm, or to merge with another provider, as has been tried in the case of Orange and Sunrise, but the WEKO ('Wettbewerbskommission', which is the Swiss federal commission of competition) did not allow the merger (WEKO 2010). They argued that this would weaken the competition. Due to the high entry barriers, the threat of new direct competition is rather low, but potentially higher from indirect competitors as MVNOs. MVNOs are a necessary competition, as outlined by WEKO and later by NZZ (2013) when prohibiting the merger of Sunrise and Orange. Thus, new competitors can be a threat to the telecom firms but are necessary in order not to restrict the market.

In looking at the data provided by analysts, we can get an initial snapshot of how analysts assessed themselves on reaction to both new and existing competition. From the checklist completion, Table 6.2 below highlights how the analysts evaluated their reaction to competitors and new products or services. A quick reaction on an indicator suggests greater perceived importance and a higher priority.

Table 6.2: Self-assessment of Reaction to Market Changes from Checklist

Impacting issue (q17) Analyst	Existing Competitors	New dangerous Competitors	Competitors' new Patents	Competitors' new Product launches	Own new Patents	Own new Product launches
Swisscom strategic analyst 1	Mainly positive	Mainly positive	None	Mainly negative	None	Positive
Swisscom department analyst	Mainly negative	I do not know	None	Mainly negative	Mainly positive	Mainly positive
Swisscom strategic analyst 3	I do not know	I do not know	None	I do not know	Mainly positive	Mainly positive
Sunrise strategic analyst	Depends	Mainly negative	I do not know	Depends	I do not know	Mainly positive
Orange strategic analyst	None	Mainly negative	I do not know	Mainly negative	I do not know	Mainly positive Other: regulatory affairs mainly negative
Cablecom operational analyst	Positive for telephone, mainly negative for Internet, TV	Mainly negative	None	Mainly negative	None	None
Cablecom strategic analyst	Mainly negative	None	None	Negative	None	Positive

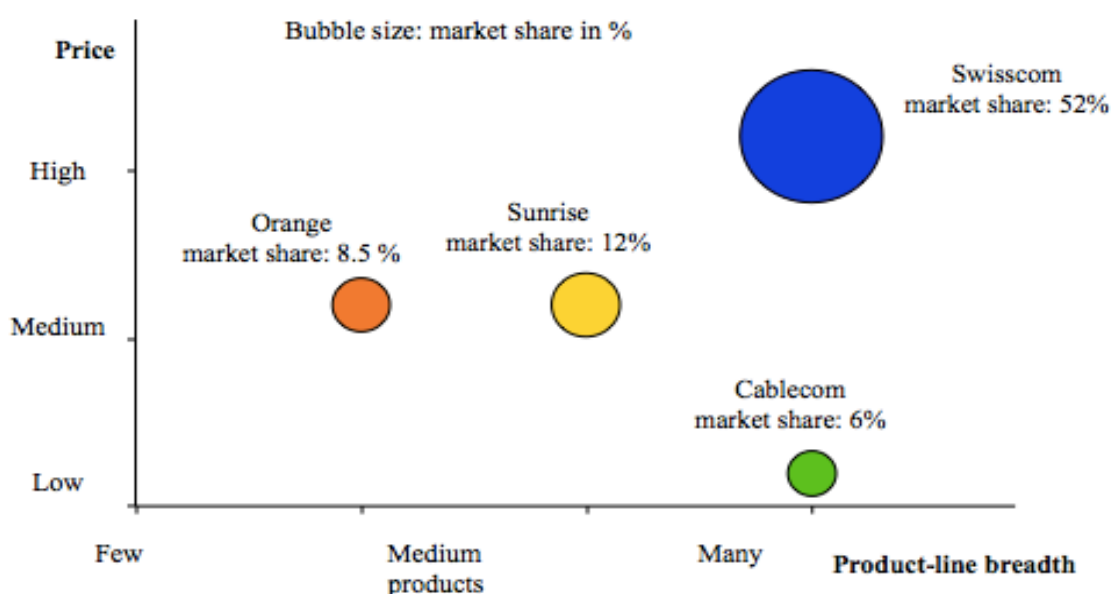
Example for impacting issue (q18) Analyst	A new dangerous Competitor enters the market	A competitor gets a new Patent	A competitor launches a new Product and takes market share	Other
Swisscom strategic analyst	Intensively watching	No action	Plan counteraction	
Swisscom department analyst	This depends on the strategy of the new competitor, but we will not become embroiled in price war, if it is possible.	I do not know	With the launch of a likewise product, so that our customers have no need to buy the competitors product.	
Swisscom strategic analyst	Depends on the market entry strategy of the new competitor. Entering the core market of the new competitor.	I do not know	Launch of a similar positioned product.	
Sunrise strategic analyst	I do not know	I do not know	Adapt product portfolio	

Orange strategic analyst	Analysis of Swiss Market impact, USP, check if products appeal to customers.	Not applicable	Product tweaking -> price cut, analysis of impact of new product, USP, counteroffer needed or not?	Regulatory: not much action, stop selling this product, comply with rules, adapt product. 3 years ago ID part for all mobile phones had to be added, today every phone has ID part.
Cablecom operational analyst	N. A.	N. A.	Adapt product roll out, pricing, commercials (marketing plans)	
Cablecom strategic analyst	Analyse threat, adapt technologies and services to counter	No action	Adapt product features, adapt pricing portfolio / bundles	

Reaction time on impacting issue (q19)	A new dangerous Competitor enters the market	A competitor gets a new Patent	A competitor launches a new Product and takes market share	Other
Analyst				
Swisscom strategic analyst 1	Immediately	I do not know	1 month	
Swisscom department analyst	I do not know	I do not know	1 – 6 months	
Swisscom strategic analyst 3	I do not know	I do not know	1 – 3 months	
Sunrise strategic analyst	I do not know	I do not know	Immediately	
Orange strategic analyst	1 month after announcement: analysis, decision, and refine decision, iterative process.	No action	1 – 2 weeks	Part of regulations imposed by regulator (regulations mention when actions have to be taken).
Cablecom operational analyst	N. A.	N. A.	4 weeks	
Cablecom strategic analyst	Immediately within a few days	No action	Immediately on the spot analysis	

While acknowledging technological developments that took place in the period of the study, Table 6.2 demonstrates that firms appeared to react to actions of direct competitors and where necessary to regulatory change. Their attitude statements showed a quicker reaction to new product or service launches from competitors, highlighting that they intensively watch direct competitors. The checklist data above showed that the intensity of rivalry among competitors is very high in the sector. This pattern can be seen in indicators of relative market share, relative price positioning and breadth of product range for the large-scale Swiss telecom firms, noted in Figure 6.3 and Table 6.3. Table 6.4 shows how the market shares of the firms have developed between 2009 and 2014.

Figure 6.3: Market Share, Product Breadth, and Prices in 2010



Data from Tables 2.1 and 2.4

Table 6.3: Rivalry of Swiss Telecom Providers in 2010

	Swisscom	Sunrise	Orange	Cablecom
Market Shares	52.2 %	11.8 %	8.5 %	5.8 %
Prices¹ (in Swiss Franc)	High (69 to 169)	Medium (60 to 95)	Medium (50 to 135)	Low (59 to 129) ²
Product Breadth³	High	Medium	Medium to low	High

Sources: Brambilla 2010; Swisscom 2010b; Cablecom 2010a. Sources 2014: Sidler 2013; Comcom 2015.

¹ Compare with actual prices in Table 8.1

² Additionally to the price ranges given for bundle offers, Cablecom offers free services for Internet use, fixed net telephony and TV

³ Sunrise and Orange offer only limited TV services

Swisscom has the highest market share, the widest product breadth and occupies a premium price positioning relative to competitors. The company offers stable broadband connection for Internet, phone, and TV. Cablecom offers a similar product bundle with less stable broadband connection but a lower price positioning. Sunrise offers all three kinds of products Internet, phone but just MTV (which predominantly addresses younger segments), while Orange offers just Internet and mobile phone. Both Sunrise and Orange are medium-priced when compared with Swisscom and Cablecom.

Table 6.4: Market Shares Swiss Telecom Providers in 2009 and 2014

Market Shares	Swisscom	Sunrise	Orange	Cablecom	Market share
Mobile Phone 09	60.2 %	19.4 %	16.7 %	MVNO	> 96 %
Mobile Phone 14	54 %	27 %	18 %	MVNO	99 %
TV subscribers 09	6.6 %			44.2 %	> 50 %
TV subscribers 14	26 %	2 %	Zattoo TV	50 %	78 %
Internet 09	53 %	10.1 %	< 1 %	17.1 %	> 80 %
Internet 14	54.3 %	9.4 %		20.9 %	84.6 %

Sources 2009: Brambilla 2010; Swisscom 2010b; Cablecom 2010a. Sources 2014: Sidler 2013; Comcom 2015.

From 2009 to 2014, Swisscom lost about 6% market share in the mobile market. The main reason is the development of prepaid offers, which are available from different MVNOs (e.g. retail trade), with the option for customers to keep the own phone number. Competitors such as Sunrise have thus gained market share. Swisscom has gained about 20 % of market share for its TV offers; therefore the decrease in mobile market share could be, in part, due to increased focus on developing TV offers. Cablecom increased market share for both products TV and Internet in this period (2009 to 2014), which may be explained by its cheaper prices for product bundles.

Brändle *et al.* (2012) identified that the telecom market is saturated, which makes product prices main important to the firms. Vernon and Wells (1966) identified the product life cycle. The saturation stage appears as the most competitive one. They found that firms pay much attention on market shares and prices when their products are in the saturation stage. Furthermore, firms focus on product improvements in order to get competitive advantages. Shaw (1996) identified that a sector is in its saturation phase or

consolidated, if four to five firms control about 60% of the market. With about 78.3% of market share in 2010, the four Swiss telecom firms exceeded this limit (see Table 2.1 on page 10).

In considering the other three forces (threat of substitute products, bargaining power of suppliers and bargaining power of customers), patterns to emerge from the data are only noted briefly. To some degree, the threat of substitute products and services has been addressed at the same time as the intensity of rivalry between firms. Substitute products in this market might include VoIP offering phone service through the Internet (VoIP 2010), or Email. Indirect competitors can offer substitute phone services such as the entertainment industry, which offers MTV access for mobile phones (see interview with Orange analyst). Other new substitutes can be visualised and can remain a threat for the telecom firms, if they fail to adapt their own product offers. For example, nowadays higher education institutions promote innovations in the ICT area with the potential to find substitute products (Swiss Federal Administration 2015), streaming TV (Amazon TV, Zattoo) instead of the rather expensive TV subscription offers, or replacing regular phone calls through Skype (2015) offers, which were available in 2010 as well.

With respect to the bargaining power of suppliers; frequency licenses are the basic suppliers that are essential for operation. The bids for frequency licenses are sold for about 15 years ahead thus no new suppliers emerged during the time of this study. The telecoms had to bid for licenses at auctions and Mobile Virtual Network Operators (MVNOs) invited telecom firms to bargain for their services (for example MTV). Sometimes they did not approach all telecom firms (see interview with analyst from Orange, 20/10/2010). The firms had a wide range of partners as for example the strategic partnership of Swisscom with Vodafone in 2001, and the partnership of Orange with the warehouse group Globus in 2009 (see Table 2.2 on page 12) (Orange 2011a). Swisscom offered a partnership-program, which was later announced on their Internet platform in the areas of IT services and business clients (Swisscom 2013a, Swisscom 2013b) showing the wide range of partnership opportunities (Swisscom 2013c, Swisscom 2013d). Sunrise and Orange were competing for partnerships with MVNO (see interview with analyst from Orange, 20/10/2010), and later explicitly

offered MVNO partnerships (Sunrise 2013; Orange 2013). Cablecom does not have its' own frequency licenses, and is a 100% daughter of Liberty Global since 2005 (Cablecom 2010b; Cablecom 2013a) the firm did not offer MVNO partnerships. Cablecom later launched a partnership program in other areas (Cablecom 2013b). The bargaining power of MVNO suppliers is limited to distinct projects or topics and the main supplier interest occurs periodically in the period before the renewal of license auctions.

In considering the bargaining power of customers, it is easy to change a phone provider, whenever a better offer is available (Swisscom 2010; Sunrise Homepage 2010; Orange 2010; Cablecom Homepage 2010). The four firms offer advantages for customers to switch their contracts to them. A trend towards offering bytes used instead of call minutes was later identified (Dharmapalan 2012), which resulted in lower prices. This allows customers to choose instant phone access and permits them to choose suppliers in a flexible way. In addition, the telecom market is evolving rapidly (BAKOM 2011) with multiple new products, services, and offers being regularly generated. Customers can easily switch from their contracts. For private customers there are maximum two-year contracts. There is also the offer to buy prepaid phone cards from various providers e.g. MVNOs (see interview with Cablecom's analyst, date of interview 10/11/2010; Teltarif 2013). With a market penetration of 104% (Metzger 2008) for mobile phones, each Swiss consumer has at least one mobile phone. BFS (2015) supplied statistical data about consumer usage of TV, mobile phone, and Internet. Figure 6.3 summarises the main important data. BFS (2011) indicated that about 15% of the households did not hold fix net telephony, due to their mobile phone usage. BFS (2015) additionally indicated that while in 1990 there were 58.4% of fix net telephony connections, this number was steadily decreasing to 54.5% in 2003 (corresponding with the 85% households), to 41.5% in 2010 and estimated 35% in 2013 as shown in Figure 6.4. Reason for this steady decrease is the increased usage of mobile phones (Brambilla, talk 29/10/2015). Additionally, new offers as for example Skype add to that decrease. The usage of telecom services as mobile phones and Internet increased to a penetration of about 100%, with high skills of consumers applying these services.

Figure 6.4: Overview Consumer usage of ICT

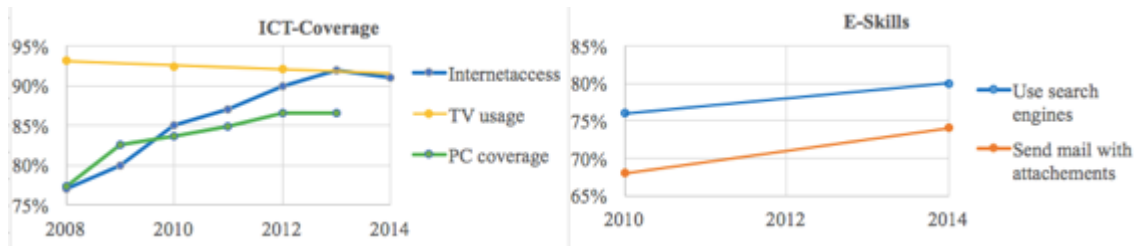


Figure 6.5: Fixed net telephony connections per 100 inhabitants

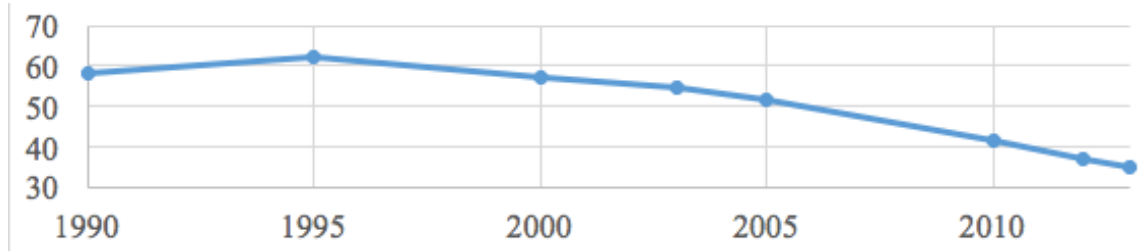
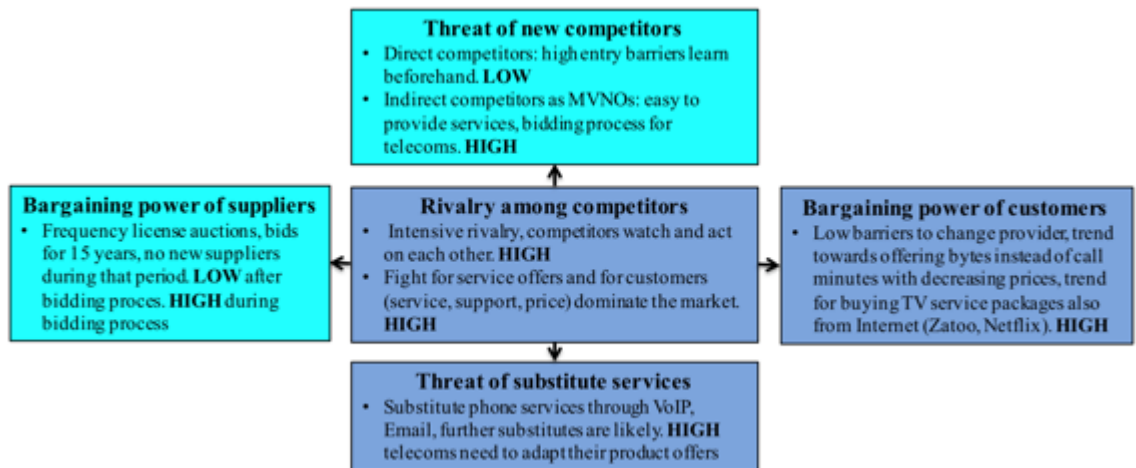


Figure 6.6 offers a summary of Porter's Five Forces Analysis for the Swiss large-scale telecom firms in 2010.

Figure 6.6: Overview of Five Forces Elements for large-scale Swiss Telecom Firms



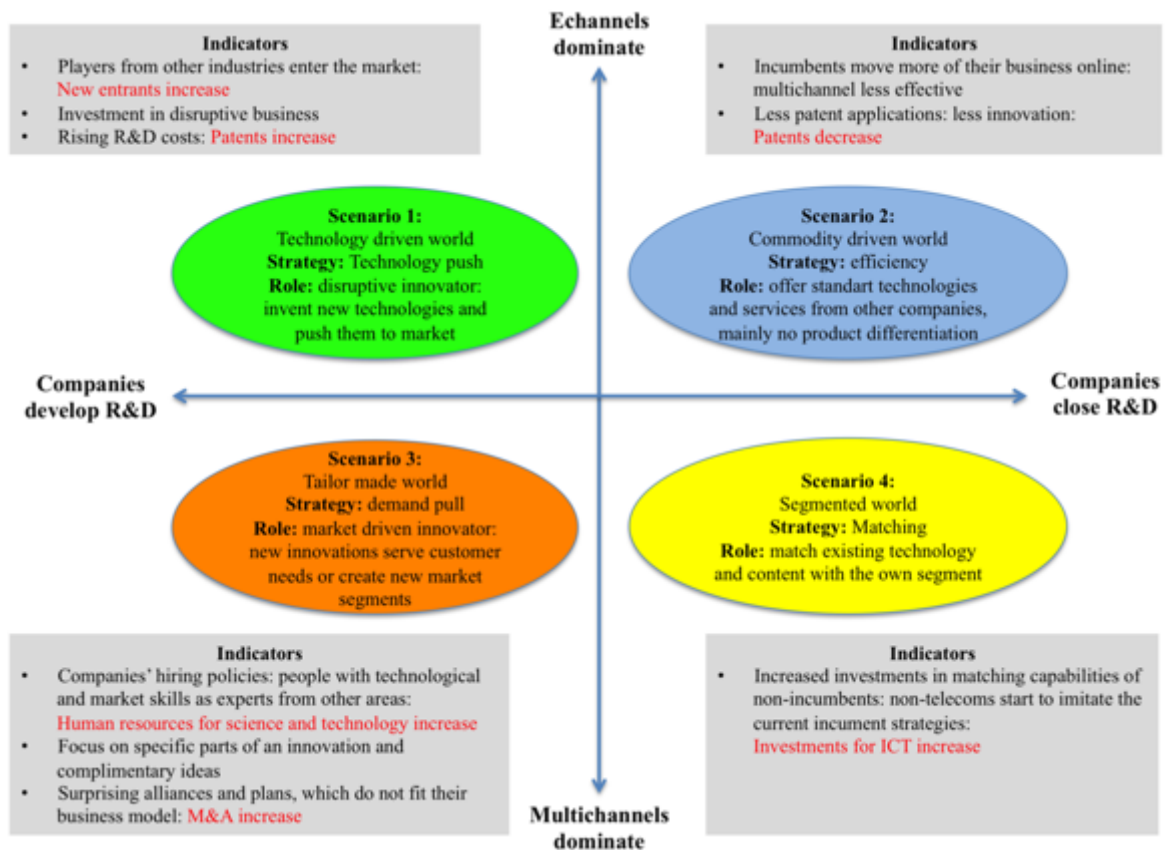
In conclusion, for Porter's five forces analysis, based on a static external analysis in 2010, the rivalry among the main competitors appears to be the main force shaping the competitive reactions of the four large-scale Swiss telecom firms. The firms intensively watch their direct competitors and (reportedly) act quickly on competitive actions. This insight is based on evidence from the interview analyses (see Section 5.6.2.2, Table 5.9) that indicated how analysts emphasise a monitoring of their rivals within their CI analyses. Their answers from the checklist (see Table 6.2) confirmed that they acted on rival actions, while they seemed less concerned with new products or new competitors.

6.4 Scenarios for the Swiss Telecom Market

6.4.1 Scenario Analysis

Scenario analyses offer a dynamic view to the possible future of a market. O'Brien, Meadows and Murtland (2007) discussed types of scenario analyses. This research uses a *descriptive* (set of possible occurrences), *exploratory scenario* (causes given, explain effects) with time a *trend*. EMCC (2005) provided a scenario analysis scheme for the telecom industry in 2005 with a 5-year time horizon up to 2010. EMCC (2005) offer a way to develop scenarios, which is considered throughout the discussion. They first identified scenarios, second possible impacts and implications are inspected and validated. Each scenario consists of a combination of hieratically classified variables as key dimension. Such a procedure depends on the experts' views and is thus highly subjective. They identified possible outcomes mapped in four scenarios, namely: *surprise free*, *information society*, *steady progress*, and *standstill*. The surprise free scenario is based on average trends. Similar to EMCC (2005), surprise-free scenario trends are applied to identify the most likely scenarios for the Swiss telecoms' CI processes. Alternatively, De Man *et al.* (2009) analysed the Dutch telecom market. He identified scenarios based on variables, which is done for this thesis as well. Brändle *et al.* (2012) analysed the telecom sector. Within their outlook, they identified saturation in Internet and cell phone subscriptions, along with a growing use of free instant messages, resulting in little sales growth. In contrast to this, the demand for data volumes via mobile Internet services increased. For the telecom sector, De Man *et al.* (2009) identified the trend where R & D had high impact and low predictability / high uncertainty until 2015. De Man *et al.* (2009) developed four scenarios based on the two trends and interviews with consulting experts and from their clients of the Dutch telecom market as shown in Figure 6.7.

Figure 6.7: Four Scenarios (adopted from De Man *et al.* 2009)



Other research supports this approach as discussed next. Lewrick, Schiffer, Jung, and Georgi (2010) identified five trends for the Swiss IT, with telecom as supplier. The trends are matched with the Scenarios of De Man *et al.* (2009).

- Sustainability: retain profit without unnecessary polluting the nature, develop sustainable technologies, related to Scenario 1) from De Man *et al.* (2009)
- Flexible IT: for example, cloud computing, virtualise IT, service driven, standards, related to Scenario 2) from De Man *et al.* (2009)
- Information intelligence: structured and task-driven handling of information, related to Scenario 3) from De Man *et al.* (2009)
user centric business: user demand for social networks, devices, communication means and external applications, related to Scenario 3) from De Man *et al.* (2009)
- IT and business alignment: effective use of IT to realise business aims, adapt IT, outsourcing, related to Scenario 4) from De Man *et al.* (2009)

Brändle *et al.* (2012) claimed a growing need for fast data transmission. The need of technologies able to deal with that criterion points towards Scenario 1) (Figure 6.7). Fibre power projects of some Swiss telecoms support that claim. In his 'risk radar', Dharmapalan (2012) identified the urge to shift usage from minutes to bytes. He

identified the importance to create new services, taking the growing data traffic into account. Offering “wholesale” services was one suggestion. Both claims suggest that firms keep their R&D (Scenarios 1) or 3) in Figure 6.7 and support the approach from De Man *et al.* (2009). Indicators from the scenarios of De Man *et al.* (2009) were applied to the Swiss telecom market to identify the scenario by targeting the main risks and the matching indicator variables.

Scenario 1) technology driven world: new entrants from other industries
Develop new technologies; networks are of secondary importance; redefine existing industry boundaries.

New entrant data were identified as indicators variables, based on information from Big 4. The data enabled to confirm or decline Scenario 1) with high validity.

Scenario 2) commodity driven world: move towards business online, decreasing patent applications
No distinctive telecom technologies; telecoms offer their products effectively; gain economies of scale; standard direct packager role for combined components.

Patent data were identified as indicators (Big 4; BAKOM 2011). The data enabled to confirm or decline Scenario 2) with high validity.

Scenario 3) tailor made world: hiring policies (technological skills and market understanding), surprising alliances and plans from traditional players
Technological progress is combined with various channels to serve different market segments; focus on serving the diversity of market segments; market driven innovator; or create new market segments with new innovations.

Data about hiring policies can be gained through vacancy searches within the news press and other sources but would require extensive search, with results of limited validity. Instead annual data for human resources for Science and Technology (S+T) (SAKE 2010a, 2010b), and mergers and plans (Section 2.2.1) were included in this scenario enabling to confirm or decline Scenario 3) with medium validity.

Scenario 4) segmented world: increasing investments in matching capabilities of non-incumbents

Innovations come from other companies, use these standard technologies for specific market segments; multichannel strategy; match most effective strategy; integrate technology, content and market segments; standard segment packager. Risk that niche players enter into the most profitable segments.

Investments for Information and Communication Technologies (ICT) were included (BFS 2010) and Swisscom's company history enabled to confirm or decline Scenario 4) with medium validity. Data for share of GDP of ICT were viewed (BFS 2010) but not included as the series consisted of only 12 annual data points with trend changes.

6.4.1.1 Restrictions to Choice of Indicator Variables used in Scenario Analysis

40 annual data points were available for Swisscom's profit (for the data see Appendix X on Table X.1). The data were collected from company reports from Swisscom and net profit for telecom department were calculated from reports of PTT (Swiss Post, Telephone and Telegraph) before it showed profit of Telephone and Telegraph in 1992. Before 1992, only contribution margins were shown covering primary costs for the telecom, which could be converted into Net Profit, as PTT did not pay taxes (publicly owned company, see calculation below).

$$\text{Net Profit}_{(1970-1998)} = \text{Revenue}_{\text{Telecom Department}} - \text{Costs}_{\text{Telecom Department}}; \text{Costs} = \frac{\text{Revenue}_{\text{Telecom Department}}}{\text{Contribution Margin}_{\text{Telecom Department}}}$$

$$\Rightarrow \text{Net Profit}_{(1970-1998)} = \text{Revenue} \cdot \left(1 - \frac{1}{\text{Contribution Margin}_{\text{Telecom Department}}} \right)$$

New entrants were included in the model (Section 6.3.3). Hyndman and Kostenko (2007) claimed that the minimum sample size should be the number of parameters plus one, which applies for data with small variability, but essentially more for practical problems. Box, Jenkins and Reinsel (2008) suggested using 50 data points or more. In this regard, the collected data points with medium to high variability provided results of limited validity. Data for new entrants for the whole economy were preferred over data for the telecom sector. Theories of disruptive innovations (Christensen and Raynor 2003) and blind spots (Fleisher and Bensoussan 2003). Gilad (2004) claim that competitors could come from an unexpected angle. The data covered the same time frame as the profit data. There is merely no entrant or exit movement for the large-scale firms (Section 2.2), there are mergers and acquisitions. Annual data for human

resources for Science and Technology (S+T) for 1993 – 2009 (17 annual data points) were not included in the model, as too few data were available. Time series data for share of GDP of ICT (BFS 2010) to compare the development of the sector with Swisscom, but only annual data from 1997 – 2008 (12 annual data points) were available, too few data to be included in the model. No data were available for new products. Annual data for investments in ICT were available for 1990 – 2008 (19 annual data points). To analyse ICT data within a time series model would have been a good way to measure the developments, but 19 annual data points were too few. Patents as an earlier stage of products were chosen instead. To compare the number new entrants with Swisscom's profit, the profit data were de-inflated using price index data for that period.

A restriction to indicator variables for time series modelling was data availability. Scenario 1) was identified as the most probable one based on the slopes of the linear regression (see Section 6.4.3). Comparing with the offered scenarios of industry change from McGahan (2004) (see Section 3.5.1.1), Scenario 1) shows a 'radical' element (new technologies). In conjunction with decision-making from Ketchen *et al.* (2004) (see Section 3.8), Scenario 1) suggests a growth strategy from R&D in the saturated market.

6.4.2 Identification of Scenario for the Swiss Telecom Market

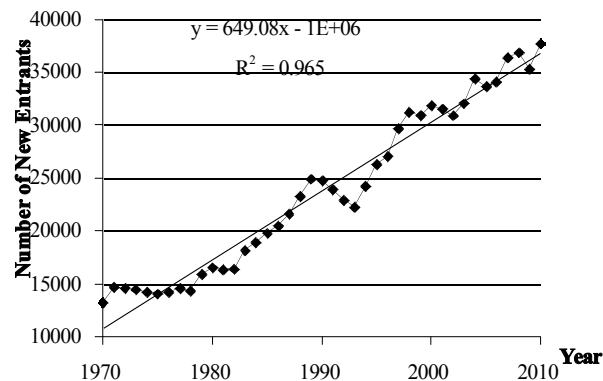
Scenarios adapted from De Man *et al.* (2009), as described above, were applied using a linear regression approach to identify the most likely scenario. The linear regression approach allows identifying a linear trend between data sets. Here the indicator data were compared over time. This allowed for the identification of trends and trend changes in a relevant way.

Scenario 1) Expectation: Positive Trend for New Entrants

Annual data of "new entrants" in Switzerland were inspected (Figure 6.8). If this scenario was to be accepted, we would expect to see an upward sloped linear trend line. New firms potentially disrupt the market, thus the telecoms focus to be innovative and invest in their own R & D. Linear regression with time showed an upward slope (649.08). "New Entrants" were measured from all industry sectors. The Intelligence

Analysts of Big 4 reported increasing market entries of Mobile Virtual Network Operators (MVNOs) confirming Scenario 1).

Figure 6.8: Number of New Entrants in Switzerland

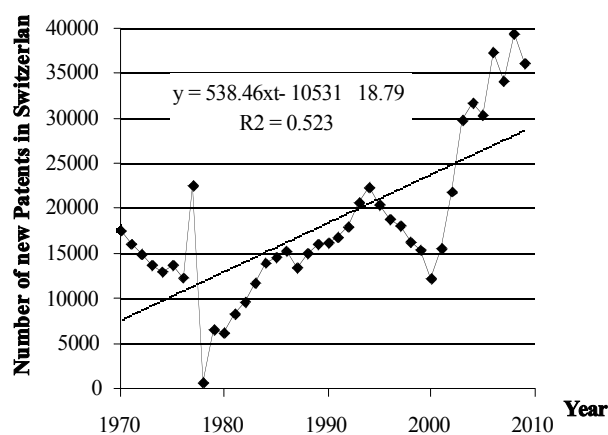


Source: Creditreform (2010) from Creditreform Switzerland, Federer, C.

Scenario 2) Expectation: No Positive Trend for Patents

Annual data of the number of new Patents applicable in Switzerland were considered for the time period 1970 – 2010 (Figure 6.9). If this scenario were to be accepted, we would expect to see no upward sloped linear trend as the telecom firms focus on being efficient in contrast to innovative. Linear regression showed an upward slope (538.46) with a steeper positive trend from 2000 onwards indicating to decline this scenario. A negative trend was limited to the 1990s. “Patents” were measured from all industry sectors. Big 4’s analysts noted to observe and adapt to new technologies, and BAKOM (2011) noted that the Swiss telecomm market is highly volatile indicating an increase of new technologies. This indicated to decline Scenario 2).

Figure 6.9: Number of New Patents valid in Switzerland

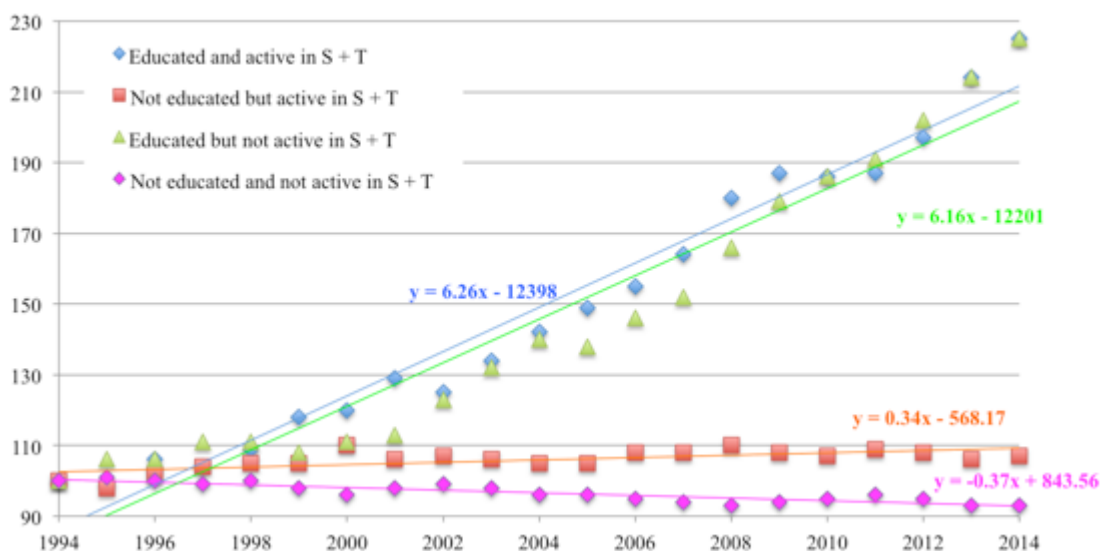


Source: Patents (2010) from Swiss Patent Office, Balmer, S.

Scenario 3) Expectation: Positive Trend Technological Skilled People in other areas

Skilled people from other areas provide ideas from another viewpoint, which can be complimentary. Annual data of human resources in S + T (Science and Technology) for time period 1994 – 2010 (SAKE 2010a, 2010b) were considered (Figure 6.10). If this scenario were to be accepted, we would expect to see an upward trend for people not educated but active in the telecom sector, which corresponds with the pink trend line. This indicator did not show number of hired individuals for each sector. The slope was steepest for individuals educated and active in S + T and technology (6.26) followed by an upward slope for individuals educated but not active in S + T (6.16) and people not educated but active in S + T (0.34). This indicated towards a weak confirmation of this scenario as it claimed that people with technological skills were hired in other areas. Additionally, the company's histories pointed towards surprising mergers and acquisitions. Orange reported to be surprised about new MVNO alliances, if not directly asked by them to make an offer. This weakly confirmed this scenario. As this scenario was not selected, the posterior confirmation from 2015 supports that choice (Figure 6.10 shows the posterior confirmation – with no changes in directions of slope compared with Data up to 2010).

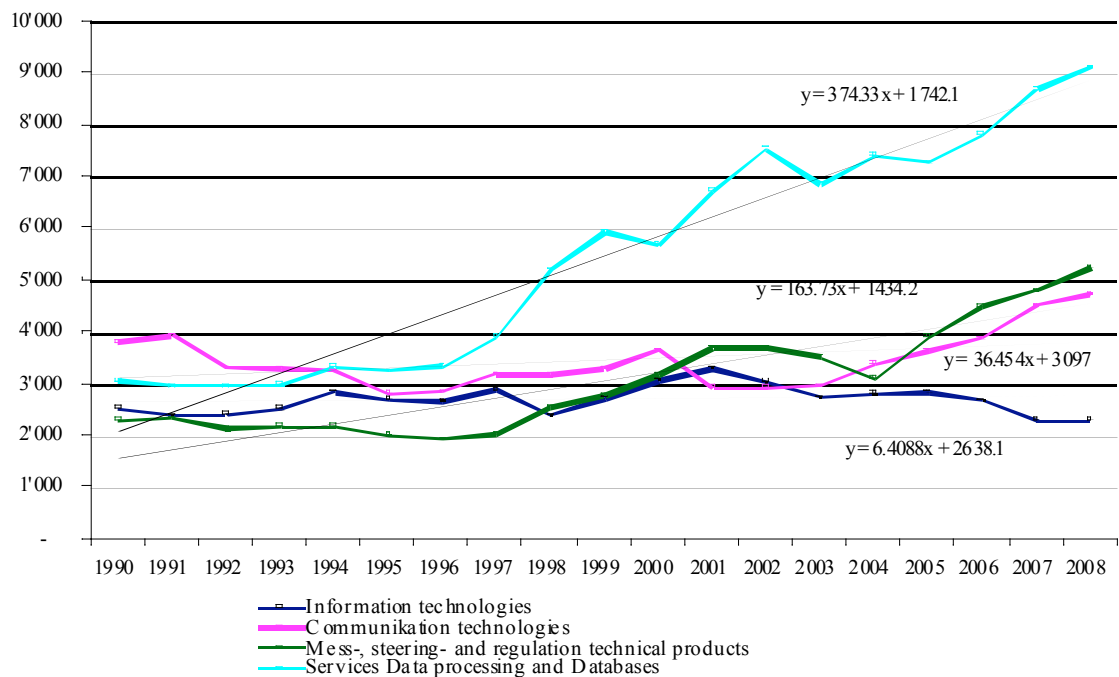
Figure 6.10: Human resources in S+T in Switzerland (Index basis = 1994 (SAKE 2010a, 2010b))



Scenario 4) Expectation: Positive Trend for Investments in the own Technologies

Based on the Swisscom history, one non-incumbent (Fastweb for new technologies in 2007 for within 1994 - 2010) was acquired. If this scenario were to be accepted, we would expect to see increasing investments in firms' existing technology in order to compete with non-incumbents in terms of adoption to own service portfolio and providing own offers. One investment pointed merely to decline the scenario. The fact that banks and private investor bought other telecom companies was not included into this scenario, as no partnership of banking with telecom services was confirmed. Considering additionally annual investment data for time period 1990 – 2008 to ongoing market prices, the investments for data processing and databases showed an overall upward slope (374.33), becoming steeper after 2003 (Figure 6.11). Investments in information technology had an upward slope (6.41) but turned downward after 2005, which indicated to decline this scenario. Thus both indicators pointed to decline Scenario 4).

Figure 6.11: ICT in Switzerland in M. CHF to ongoing prices (BFS 2010)



6.4.3 Identification of most likely Scenario

e-channels are ecommerce and customer web portals. De Man *et al.* (2009) identified within this scenario that they replace physical distribution channels. Own telecom stores

for mobile industry and resellers show the increased demand of customers to order products online. Physical mail decreased from 2762 M. (115 %) in 2006 to 2365 M. (98.5 %) in 2010 (Swiss Post 2011) confirming the decline of physical channels. This confirmed Scenarios 1) and 2), and indicated to decline Scenarios 3) and 4) (De Man *et al.* 2006). R&D activities indicated to confirm Scenarios 1) and 3). Three out of four firms were active in innovations or R&D (Swisscom 2011d, 2011e; Orange 2011e; Cablecom 2011c). Taken together analyses for each of the scenarios (accept 1), and 3), decline 2), and 4)) and indications for each pair of them (accept 1), 2), decline 3), 4)), **Scenario 1)** ‘technology driven world’ remained as the most probable one. Scenarios 2) and 3) appeared less probable as Scenario 2) was rejected at the individual analysis and Scenario 3) weakly rejected at the individual analysis and confirmed at the scenario pair analysis. Scenario 4) was neither confirmed at the individual nor at the pair analysis.

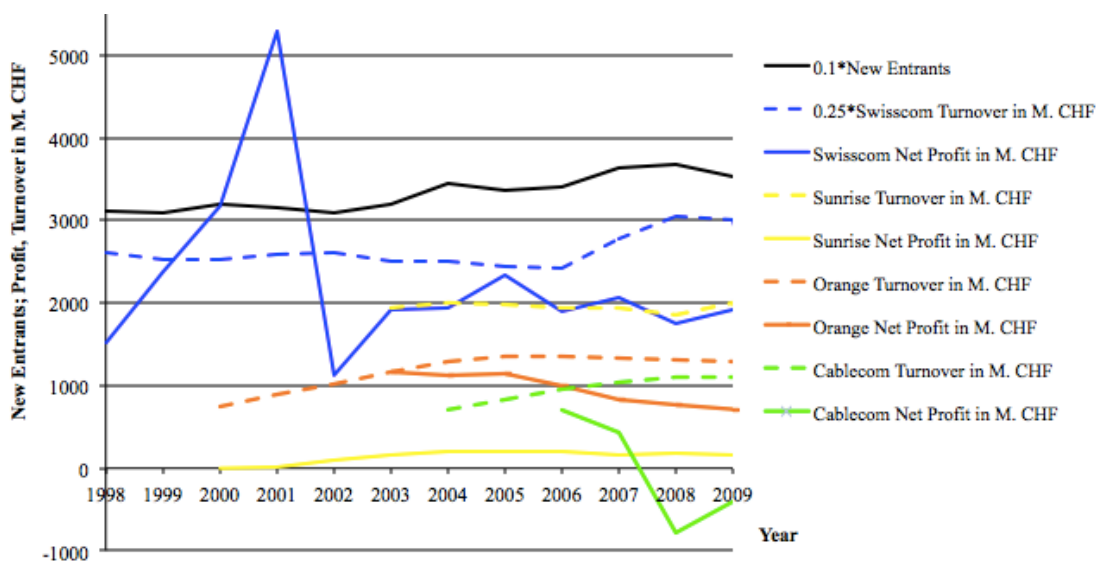
6.4.3.1 Indicators for the Swiss Telecom Market

If we wish to assess whether the data for the telecom firms matches scenario 1), we need to establish the critical indicators to be used in this assessment. In the interviews reported in Chapter 5, the analysts of the four large-scale Swiss telecom firms identified the importance of two key CI actions:

- observe and act on new entries and bids of new MVNOs in the short term
- observe and act on market entrants of new main competitors in the long term

This focus on new entrants corresponds with the key emphasis in scenario 1) and can be regarded as indicators that are contextually well defined (i.e. firms themselves have identified these elements as important in order to understand and respond to the external competitive environment). This part of scenario analysis shows the annual data for all four firms. The indicators – new entrants, turnover and profit of the Swiss telecom firms are shown in Figure 6.12 below. In spite of the limited data points, some positive associations between new entrants and profit and turnover suggest that the variables have the same trend direction.

Figure 6.12: New Entrants and Swiss Telecom Firms' Profit and Turnover



There were only a few data points available for Sunrise, Orange, and Cablecom, and no turnover data for Swisscom before 1995. In order to examine scenario 1) Swisscom was the only firm with a sufficient number of annual profit data. Therefore, the confirmation of scenario 1) was undertaken for Swisscom only.

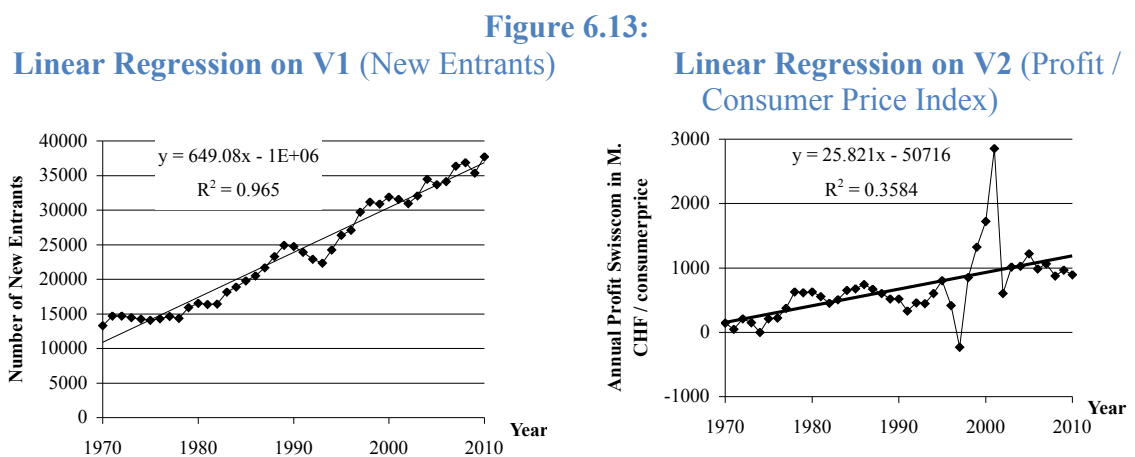
6.5 Scenario Analysis for Swisscom

6.5.1 Indicator Data used in Scenario Analysis for Swisscom

The annual data were number of “new entrants” in Switzerland (V1), and “profit” of Swisscom, Inc. in M. CHF (V2). 40 observations were available for the years 1970 to 2010. Since the sample size of $n = 40$ is rather small, the subsequent statistical analyses and models should not be over interpreted. They serve merely as a detailed exploratory analysis, which indicates possible models for analysing larger data sets in the future. Other economic indicators were additionally analysed in Section 6.4 in terms of correlation, slope, and expert validation. These were: “Number of Patents”, “Consumer Price Index” in %, “workforce” in M. persons, “gross workforce” in %, “unemployment rate” absolute and in %, “Human Resources for Science and Technology” in %, “annual aggregate of GDP” in M. CHF, and “deflated GDP” in %. The indicator “consumer price index” was included into “profit” (V1) to reflect actual prices. Even though the indicator “human resources for science and technology” would have fitted well to

Scenario 3), it could not be included as the Swiss statistical office only started to measure it in 1993 providing only 18 annual data points to date. The number of usable data points (40) enabled to deliver a low to medium validity of the results due to the variance of “profit” data.

BAKOM (2005) claimed that the implementation of a mathematical system for compiling statistics for the telecommunications market was difficult because it was highly evolutionary (volatile). For profit data from Swisscom the history of the market added to that difficulty, changing from a monopoly market with Swisscom being a department of the Swiss PTT (Post, Telephone, Telegraph) to a holding (Section 2.2). This resulted in a high peak of “profit” data for that period (years 1996 - 2002). For that reason, a sensitivity analysis was conducted to evaluate if the results were similar to the original model with smoothed values for that period (Figure 6.18). Figure 6.13 plots the 40 annual data points (for data compare with Appendix X).



Data sources: V1 = Number of New Entrants: Creditreform (2010) supported from Federer, C. V2 = Profit Swisscom in CHF M. 1997 to 2010: Swisscom (2010c), 1970 to 1996: Swiss Postal Archives supported from Burry, M. Corrected with consumer price index: Swiss federal statistical office (Consumer price index 2010).

The linear regression model showed a rather low determination coefficient between variables V1 (new Entrants) and V2 (Profit) with $R^2(V1, V2) = 0.353$. It was rather low for V2 with year (t) as $R^2(t, V2) = 0.358$, and high for V1 with t as $R^2(t, V1) = 0.965$. Due to economic rationale it was expected that a model fitting the values differently

would provide higher values for R^2 (V1, V2). The peak between 1998 and 2005 came from the privatisation process of Swisscom (Section 2.2).

6.5.2 Data Inspection for Time Series Model

Time series model choice, economic rationale, practical implications, and Autocorrelation Function (ACF) and Partial Autocorrelation Function (PACF) of the data were considered to specify the model.

6.5.2.1 Model Specification

A Seasonal Autoregressive Integrated Moving Average (SARIMA) time series model as the most complex univariate model includes seasonal (S(s)) autoregressive (AR(p)), integrated (I(d)), and moving average (MA(q)) components. SARIMA models can be used to estimate non-stationary time series models with trend, increasing variance (Göb, Weiss and Hartmann 2003), and seasonal patterns. S(s) are estimated seasonality values based on patterns of the scatterplot and economic rationale. An estimation of autocorrelations based on OLS estimation with present and lagged values of each variable serves to estimate the AR(p) components, using for example Yule-Walker equations (Schlittgen 2001). To include the AR(p) component was indicated due to ACF and PACF patterns (Table 6.5). I(d) are differences of one value of the time series variable with its past value to remove the time influence. MA(q) are moving averages of the model for non-linear trend pattern. Due to the patterns of the scatterplot of new entrants (V1) and profit (V2) and as only annual data for V1 were available, seasonal components were not included, instead of I(d) or MA(q) components a trend was included. A sensitivity analysis was conducted with smoothed peaks of V2. State space approaches were not applied. They are rather complex, and the small sample size of $n = 40$ render them inappropriate (How 2007). The Vector Autoregressive (VAR) multivariate model was chosen because it allows analysing directive effects between variables, as lagged values of one variable are included to explain the other variable, as they are modelled simultaneously. The choice of variables was based on Scenario 1) as “New Entrants” (V1) and V2 “Profit” (V2). Both datasets had a time trend and constant (Figure 6.11). The remaining components were autoregressive, trend, and constant.

The VAR model has parameters for each variable of the own and the other variables in terms of lagged values. If the parameters of another variable are significant for a distinct variable, this means this variable has a directional effect on the other. Thus, this variable helps to explain another variable along with the occurring time (lag).

In a VAR model for time series, the k -dimensional observation vector

$$\mathbf{V}_t = \begin{bmatrix} V_{1,t} \\ V_{2,t} \\ \dots \\ V_{k,t} \end{bmatrix}$$

at time t is modelled as constant vector plus a linear time trend plus a linear function of the p previous observation vectors $V_{t-1}, V_{t-2}, \dots, V_{t-p}$. In formulae: for $t = p+1, p+2, \dots, n$.

$$V_t = c + t \cdot b + A_1 \cdot V_{t-1} + A_2 \cdot V_{t-2} + \dots + A_p \cdot V_{t-p} + \varepsilon_t$$

The ingredients are: fixed vectors

$$c = \begin{bmatrix} c_1 \\ c_2 \\ \dots \\ c_k \end{bmatrix} \quad \text{and} \quad b = \begin{bmatrix} b_1 \\ b_2 \\ \dots \\ b_k \end{bmatrix}$$

describing constant and linear trend, fixed matrices

$$A_s = \begin{bmatrix} a_{1,1}^s & a_{1,2}^s & \dots & a_{1,k}^s \\ a_{2,1}^s & a_{2,2}^s & \dots & a_{2,k}^s \\ \dots & \dots & \dots & \dots \\ a_{k,1}^s & a_{k,2}^s & \dots & a_{k,k}^s \end{bmatrix}, \quad 1 \leq s \leq p$$

describing the influence of V_{t-s} on V_t , and the so-called innovation vectors

$$\varepsilon_t = \begin{bmatrix} \varepsilon_{1,t} \\ \varepsilon_{2,t} \\ \dots \\ \varepsilon_{k,t} \end{bmatrix}$$

which are independent and identically distributed random vectors with mean vector $\mathbf{0}$.

Sometimes one even assumes that the innovation vectors follow a multivariate Gaussian distribution $N_p(0, \Sigma)$.

The unknown parameters are estimated by a least-squares procedure, yielding estimated constant and trend vectors \hat{c} , \hat{b} and estimated matrices $\hat{A}_1, \hat{A}_2, \dots, \hat{A}_p$. Then for

$t = p+1, p+2, \dots, n$ we consider the fitted observation vectors

$$\hat{\mathbf{V}}_t = \hat{c} + t \cdot \hat{b} + \hat{\mathbf{A}}_1 \cdot \mathbf{V}_{t-1} + \hat{\mathbf{A}}_2 \cdot \mathbf{V}_{t-2} + \dots + \hat{\mathbf{A}}_p \cdot \mathbf{V}_{t-p}$$

and the so-called residuals $\hat{\varepsilon}_t = V_t - \hat{V}_t$,

i.e. the differences between observed and fitted observations. In many procedures these residuals $\hat{\varepsilon}_t$ are used as proxy for the unobserved innovations ε_t .

6.5.2.2 Autocorrelation Function (ACF) and Partial Autocorrelation Function (PACF)

For a stationary real-valued time series $(V_t)_{t=0, \pm 1, \pm 2, \dots}$, the Autocorrelation Function (ACF) provides for each lag $m \geq 0$ the correlation $ACF(m) = correlation(V_t, V_{t+m})$

The Partial Autocorrelation Function (PACF) is defined as

$PACF(m) = correlation(V_t - \hat{V}_{t:t+1:t+m-1}, V_{t+m} - \hat{V}_{t+m:t+1:t+m-1})$, where $\hat{V}_{s:a:b}$ denotes the best affine predictor of V_s from $(V_u)_{u=a}^b$ (Schobert 2008; Füss 2007/08). Table 6.5 provides some information about ACF and PACF in standard time series models.

Table 6.5: Model Selection based on ACF and PACF (Schumway and Stoffer 2000)

Model	ACF	PACF
AR(p)	“∞” exponential decline or damped sinus wave	“finite” $\rho(m) = 0$ for $m > p$
MA(q)	“finite” $\rho(m) = 0$ for $m > q$	“∞” exponential decline or damped sinus wave
ARMA(p,q)	As AR(p) from $m > q$	As MA(q) from $m > p$

In the data analyses standard estimators of the ACF and PACF are applied to the

residuals $(\hat{\varepsilon}_{i,t})_{t=1}^n$ of both variables to check whether they show the expected behaviour

for a given lag p . Precisely, $ACF(m)$ is estimated by

$$ACF_m = r_m = \frac{\sum_{t=p+1}^{n-m} \hat{\varepsilon}_{i,t} \cdot \hat{\varepsilon}_{i,t+m}}{\sum_{t=p+1}^n \hat{\varepsilon}_{i,t}^2} \quad \text{estimated independently for variables } j = V1, V2$$

The PACF is estimated via recursion formulae provided by Durbin (1960)

$$\rho_{t,a} = \rho_{t-1,a} - \rho_{t,t} \cdot \rho_{t-1,t-a}$$

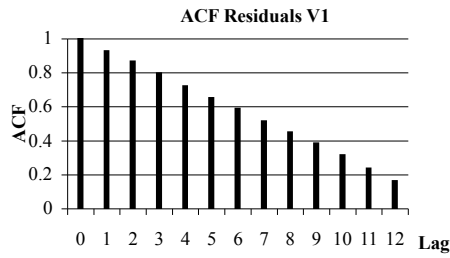
Values bigger than the Critical Value (CV) are included in lag order selection.

$CV = \pm 2 / \sqrt{n} = 2 \text{ SD}$; $n = \text{number of observations} = 40$; $CV = [-0.31; 0.31]$. Figure 6.14

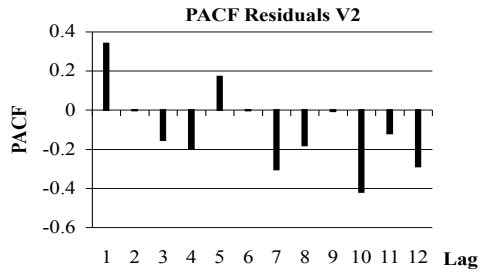
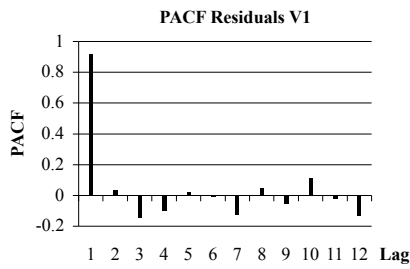
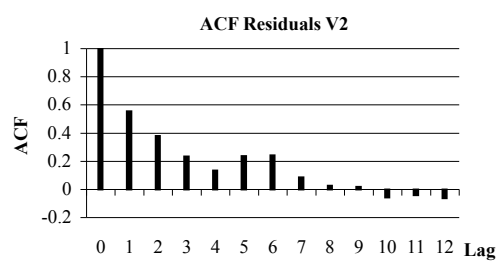
plots ACF and PACF for univariate linear regression of V1 and V2 with CV.

Figure 6.14:

ACF and PACF of V1
“New Entrants” Linear Model



ACF and PACF of V2
“Profit” Linear Model



For V1 the ACF residuals progressed towards 0 with increasing lag order but above CV up to lag 10. V2 had ACF residuals above CV up to lag 3, smaller ones for lags 5 and 7. For PACF both V1 and V2 had residuals above CV for lag 1. Based on Table 6.5 AR or ARMA models could fit to the data.

6.5.2.3 Lag Order Specification

With 40 data points the results were of lower validity, thus economic rationale was used to improve the quality of the estimation. This is because the number of parameters (P) decreases the degrees of freedom (DF). The DF give roughly the number of univariate data values remaining to estimate properties of the innovations $\varepsilon_{i,t}$ for each i .

With increasing lag order DF diminish and require more data points (Gabler 2011). The general VAR model with n consecutive k -dimensional observations requires for the i -th variable the estimation of the constant c_i , the trend b_i , and the kp influence parameters $a_{i,j}^s$, $1 \leq j \leq k$ and $1 \leq s \leq p$. Note also that for a VAR model with lag p a starting phase of p observations V_1, V_2, \dots, V_p is needed and only $n - p$ residual vectors are obtained.

Hence it ends up with:
$$DF = n - p - 2 - kp$$

Table 6.6 shows degrees of freedom for this particular setting with $k = 2$ and $n = 40$.

Table 6.6: Degrees of Freedom (DF) for k = 2, n = 40

Lag order p	1	2	3	4	5	6	7	8
DF	35	32	29	26	23	20	17	14

This shows already that high lag orders p are not recommended. Lag order 4 was chosen based on results from ACF, PACF, sample size, and economic rationale. Table 6.7 shows model coefficients, standard errors (S.E.), p-values, and squared correlations (r^2).

Table 6.7: Model Coefficients and Significance Levels

	V1 “New Entrants”	V1 S.E.	V2 “Profit”	V2 S.E.
V1.I1	0.88 ***	0.17	0.19 *	0.08
V2.I1	-0.07	0.39	0.41 *	0.18
V1.I2	-0.56 *	0.26	-0.30 *	0.12
V2.I2	-0.23	0.40	0.02	0.18
V1.I3	0.60 *	0.27	0.26 #	0.18
V2.I3	0.57	0.39	-0.17	0.18
V1.I4	-0.48 *	0.18	-0.08	0.09
V2.I4	-0.23	0.39	-0.16	0.18
Constant	4888.70 ***	1191.50	-538.8	562.28
Trend	382.29 ***	93.01	-23.45	43.26
Residuals	-1569.4 to 1228.2		-890.5 to 987.2	
Residual S. E.	869.5		404	
Multiple Correlations r^2	0.99		0.53	
P-value	< 2.2e-16		0.006	
Significance codes	0.001 = ***		0.01 = **	
			0.05 = *	
			0.1 = #	

The Standard Errors (S.E.) show, how much the model coefficients could vary within 2 standard deviations of normal distribution. The significance codes show the goodness of the parameter estimations in terms of the t-value

$$t - Value = \frac{V_{i,j}}{V_{i,j} S.E.}$$

The significance codes showed that the model parameters of lagged values of V1 for lags 1, 2, 3, and 4 (V1. I1, V1.I2, V1.I3, and V1.I4) were indispensable to model the actual behaviour of V1, while lagged values of V2 lag 1 (V2.I1), and lagged values of V1 lag 1, 2, and 3 (V1.I1, V1.I2, and V1.I3) were indispensable to model the actual behaviour of V2. Thus lagged coefficients from V1 were used to model V2 (“Profit”) while coefficients of V2 were not that significant to model V1 (“New Entrants”). The results put forward that Big 4 add data “new entrants” as indicator into Scenario 1) to their analyses.

The other parameters were not significant but kept in the fitted model to improve the accuracy of the model as these were the best possible estimations for this model. The values of multiple $r^2_1 = 0.99$ and $r^2_2 = 0.53$ supported that the model improved the data fit compared to the linear regression model (Figure 6.13). The matrix equation form of the fitted model is shown below (Green 2000).

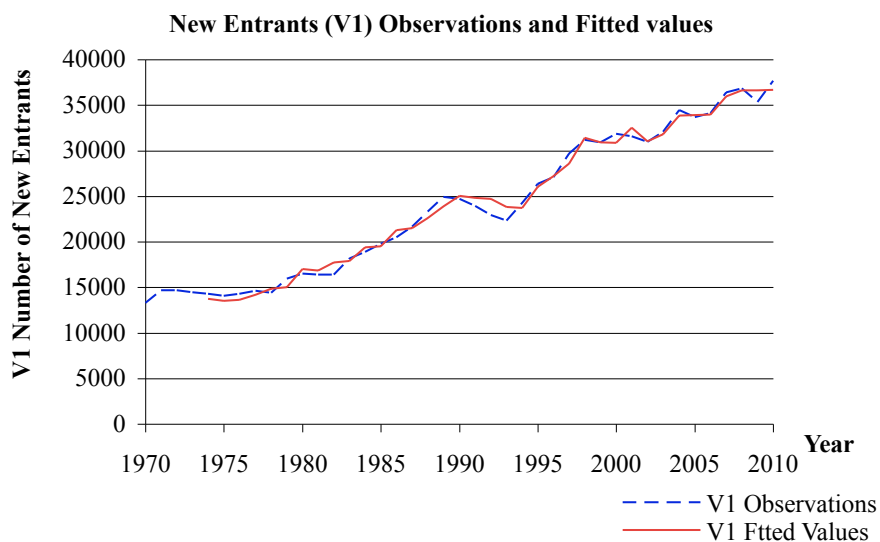
$$\begin{bmatrix} \hat{V}_{1,t} \\ \hat{V}_{2,t} \end{bmatrix} = \begin{bmatrix} 4888.70 \\ -538.80 \end{bmatrix} + t \cdot \begin{bmatrix} 382.29 \\ -23.45 \end{bmatrix} + \begin{bmatrix} 0.88 & -0.07 \\ 0.19 & 0.41 \end{bmatrix} \cdot \begin{bmatrix} V_{1,t-1} \\ V_{2,t-1} \end{bmatrix} + \begin{bmatrix} -0.56 & -0.23 \\ -0.30 & 0.02 \end{bmatrix} \cdot \begin{bmatrix} V_{1,t-2} \\ V_{2,t-2} \end{bmatrix} + \begin{bmatrix} 0.60 & 0.57 \\ 0.26 & -0.17 \end{bmatrix} \cdot \begin{bmatrix} V_{1,t-3} \\ V_{2,t-3} \end{bmatrix} + \begin{bmatrix} -0.48 & -0.08 \\ -0.23 & -0.16 \end{bmatrix} \cdot \begin{bmatrix} V_{1,t-4} \\ V_{2,t-4} \end{bmatrix}$$

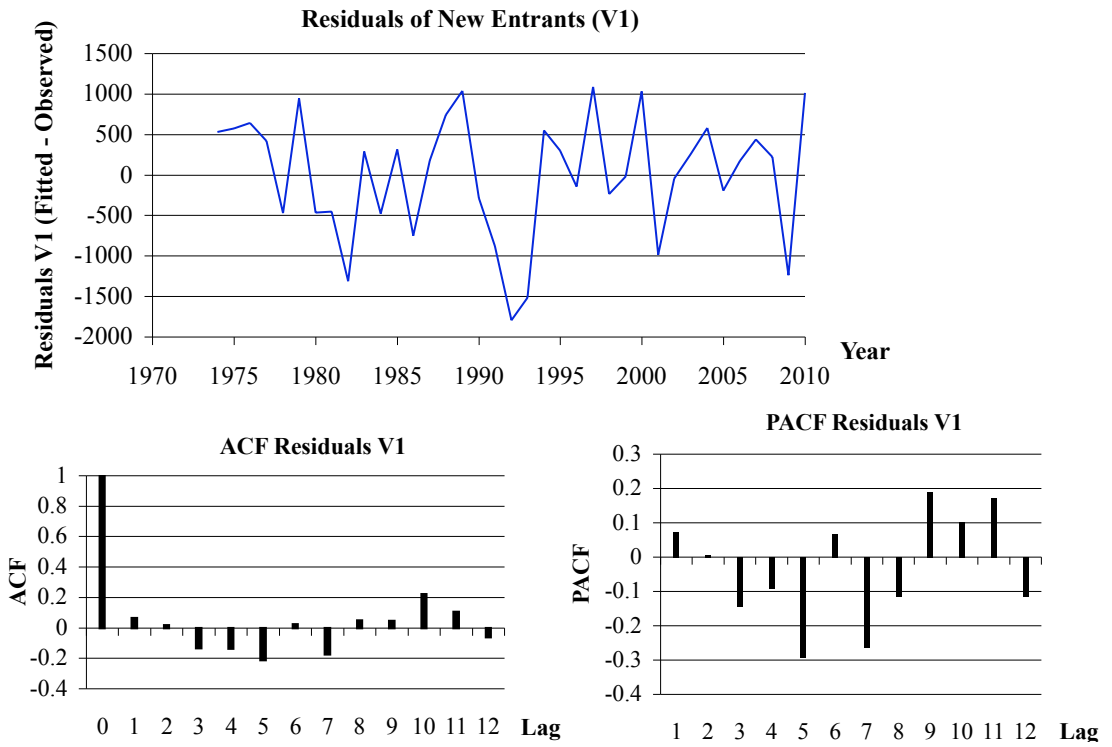
and the corresponding residuals satisfy

$$\hat{\varepsilon}_{1,t} \in [-1792.88; 1087.64], \hat{\varepsilon}_{2,t} \in [-889.54; 986.88]$$

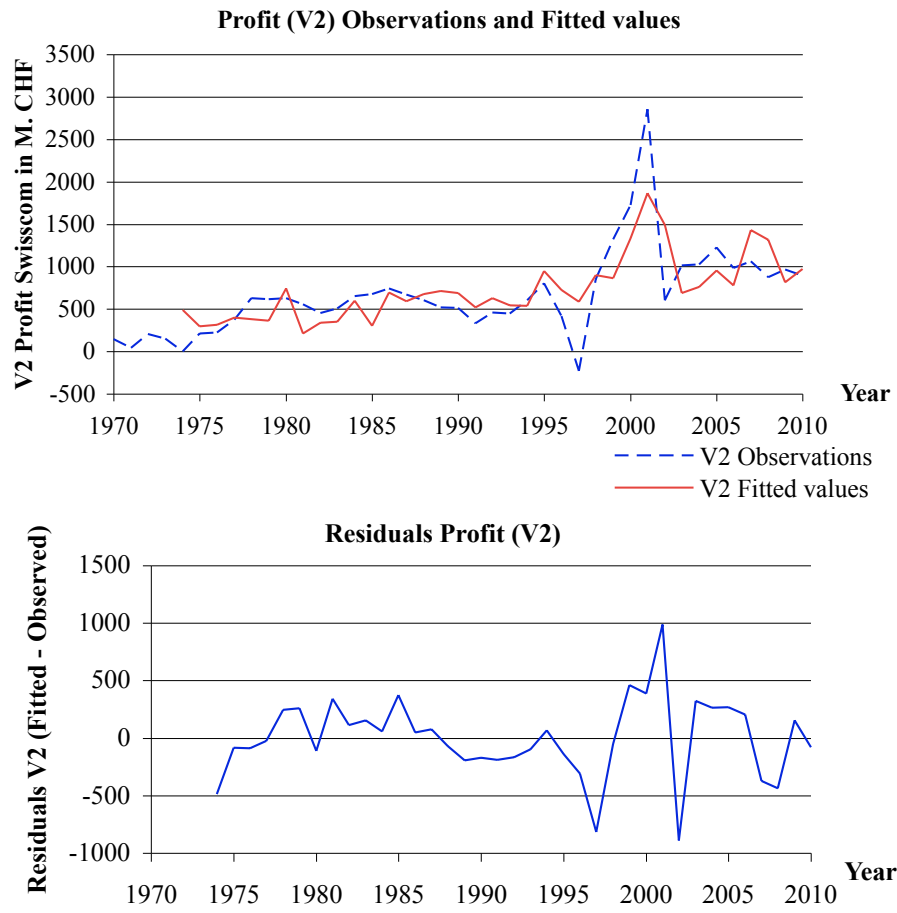
Figure 6.15 plots the model fits, the residuals, ACF, and PACF for V1 and V2. ACF express the relation between the variances at time t and variance at start time. The PACF express the relations of variance of residuals at time t with residuals of previous time points all possible lag order k (Johannssen 2009).

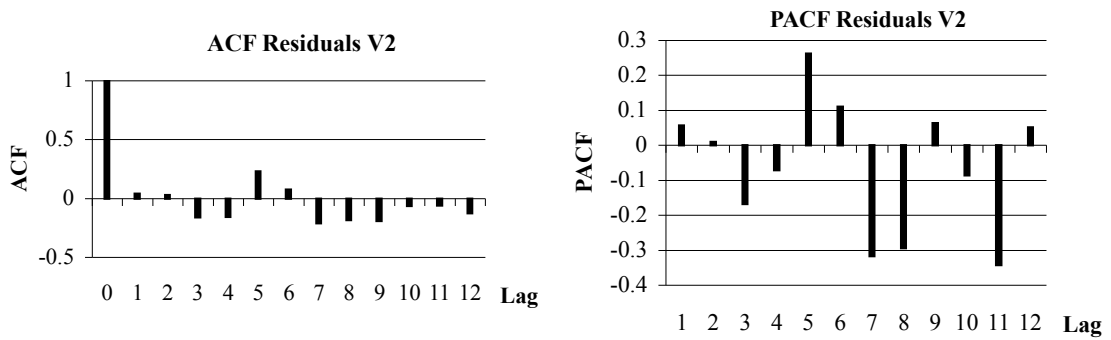
Figure 6.15:
V1 (New Entrants) with Model Fit, Residuals, and ACF and PACF Residuals





V2 (profit Swisscom) with Model Fit, Residuals, and ACF and PACF Residuals



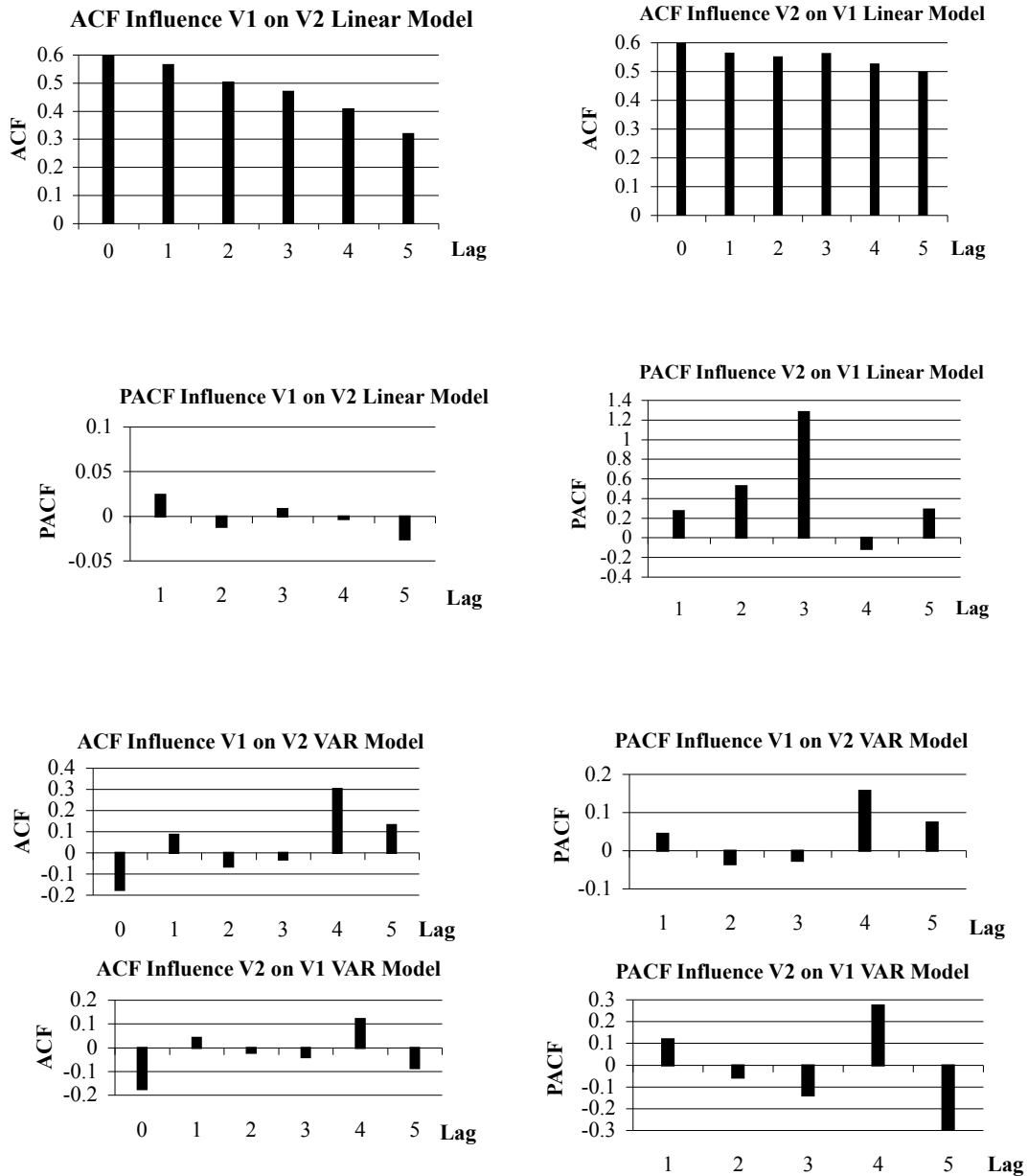


For both variables all ACF and PACF peaks are below CV. ACF for LO 0 must be 1 (perfect correlation of time 0 with itself). Thus the lag 4 VAR model fitted the data. The ACF for both variables decreased with increasing lag order. The PACF for V1 were higher for lag 5 and 7 and trended toward zero with increasing lag order such that the model could be used. For V2 the ACF showed only one higher peak at lag order 5, the PACF showed higher peak at lag orders 5 and 7. It was expected that an VAR Model fit for V1 and V2, as PACF decreased with increasing lag order (Schlittgen 2001; Thome 2005). The AR part was included in the model as the VAR model included an autoregressive part, and a trend. The evaluated lag 4 VAR model fitted well for V1, and could be used for V2. Thus a lag 4 VAR model can be applied to predict future behaviour of both variables and as such can be suggested for the Swiss telecoms.

6.5.2.4 Comparison ACF and PACF of Linear Model with VAR Model

Comparing the ACF and PACF of the linear model (Figure 6.14) with those of the VAR model (Figure 6.15) the VAR model is superior to the linear model because no peaks beyond the critical values were detected. The peaks at lag 8 are disregarded because the number of observations ($n = 40$) would not allow including these into the VAR model (lag 8 would reduce DF to 14). Inspecting the influence of one variable to the other from the past provided ACF and PACF for both models as shown in Figure 6.16 below (inspected up to lag 5).

Figure 6.16: ACF and PACF Linear Model and VAR Model



The VAR model improved the accuracy of the results as the ACF and PACF influences of the residuals diminished. Influencing factors were included in the model hence no longer shown in the ACF and PACF residuals. The PACF peak at lag 5 from V2 on V1 was not included because the degree of freedom would diminish too much.

6.5.3 Model Testing

6.5.3.1 Roots of VAR model

When using the fitted model for the prediction of future values, it is important to know whether it describes a stationary time series after removal of constant and linear time trend. This is equivalent to the so-called companion matrix of the lag 4 model.

$$\begin{bmatrix} \hat{A}_1 & \hat{A}_2 & \hat{A}_3 & \hat{A}_4 \\ I & 0 & 0 & 0 \\ 0 & I & 0 & 0 \\ 0 & 0 & I & 0 \end{bmatrix} (8 \times 8)$$

having no eigenvalues λ with $|\lambda| \geq 1$ of the determinant of the companion matrix. The characteristic polynomial is calculated from the companion matrix for the lag 4 model with trend (Mayr 2009) providing:

$$I_8 - \hat{A} \cdot \lambda - \hat{A} \cdot \lambda^2 - \dots - \hat{A} \cdot \lambda^k - \dots - \hat{A} \cdot \lambda^8 + \mathbf{b}_t - \hat{A} \cdot \mathbf{b}_{t-1} - \hat{A} \cdot \mathbf{b}_{t-2} - \hat{A} \cdot \mathbf{b}_{t-3} - \hat{A} \cdot \mathbf{b}_{t-4} = 0$$

$$\lambda^8 - 1.29\lambda^7 + 0.92\lambda^6 - 0.62\lambda^5 + 0.56\lambda^4 + 0.04\lambda^3 - 0.26\lambda^2 + 0.09\lambda + 0.06 = 0$$

The model of lag order 4 did not have values $|\lambda| \geq 1$. The results were 8 complex roots λ with solutions given below as absolute lengths (four double solutions).

$$|\lambda_i| = |0.90|; |0.83|; |0.80|; |0.41|$$

6.5.3.2 Test for normality

A test for normality of residuals was conducted as the VAR model can only be applied, if variables are independent and identically distributed. Due to the small degrees of freedom and as the variables would have to be adapted to the tests, the independent and identically distributed $n - p$ residuals $\hat{\varepsilon}_{i,p+1}, \hat{\varepsilon}_{i,p+2}, \dots, \hat{\varepsilon}_{i,n}$ were applied. The tests were merely used as a descriptive means and further indication, if the VAR model could be applied. The Null Hypothesis H0 stated to not decline normal distribution, while the alternative Hypothesis H1 declined normal distribution of the model residuals.

The Jarque Bera (JB) Test (Jarque and Bera 1987) computes Skewness (S_3) and Kurtosis (S_4) together to determine normal distribution (ND) of the residuals of the estimated VAR model. Skewness determines the derivation of normal distribution in terms of more right or left sided than centred, and Kurtosis compares measured peaks with ND. These moments of distribution (S) are computed for the residuals of the variables (new entrants and profit indicated with j below) for the lag 4 VAR model (indicated with p = 4 below).

$$\begin{aligned}
 \text{Var}(x) = \hat{S}_{j,2}^2 &= \frac{1}{n-p} \cdot \sum_{t=p+1}^n \varepsilon_{t,j}^2 & \text{Skewness} = \hat{S}_{j,3} &= \frac{1}{n-p} \cdot \frac{\sum_{t=p+1}^n \varepsilon_{t,j}^3}{\hat{S}_{j,2}^3} \\
 \text{Kurtosis} = \hat{S}_{j,4} &= \frac{1}{n-p} \cdot \frac{\sum_{t=p+1}^n \varepsilon_{t,j}^4}{\hat{S}_{j,2}^4} - 3 & \text{JB} &= \frac{n-p}{6} \cdot \left(S_{j,3}^2 + \frac{S_{j,4}^2}{4} \right)
 \end{aligned}$$

The χ^2 - Test compares squared difference of residuals with normal distribution (ND), computes p values and compares them on a significance level $\alpha = 0.05$. χ^2 tests have two degrees of freedom (DF) for Jarque Bera (JB) and one DF for Skewness and Kurtosis test. Table 6.8 shows the results.

Table 6.8: Normal Distribution of Variables V1 and V2

	χ^2	Critical Value χ^2 ($\alpha = 0.05$)	p-value
Jarque Bera Test	3.54	5.99	0.47
Skewness Test	2.30	3.84	0.32
Kurtosis Test	1.23	3.84	0.54

The results are below the critical test values (JB = 3.54 < 5.99, Skewness = 2.30 < 3.84, and Kurtosis = 1.23 < 3.84). The significance of H0 is shown in p-values for the three moments all much above 0.05, thus normal distribution (ND) of residuals was not rejected and indicated to fit the data to a VAR model.

6.5.3.3 Economic Rationale

A lag 4 model with trend was estimated. Lag 4 includes events, which happened one to four years before influence present results. It was assumed that this also hold true for the forecast, as this was recursively computed from the same model. Due to the number

of data points, a model of higher lag order would further decrease the validity of the model because of the number of parameters needed. For a lag 5 model the Degree of Freedom (DF) would reduce to $DF = 23$ for each variable, thus too much parameters for 40 data points. Some Information Criteria for lag order additionally indicated to choose lag order 4. These tests were not provided as they showed differing results. Scholars do not agree about them, which is reflected through 5 different information criteria computations from 5 different scholars providing differing results.

Economic arguments to choose lag order 4 are given now: as Big 4 do not invent new devices, a longer reaction time is needed because new products have only an effect on sales of Big 4 when they are ready from other countries. They do not adapt their product strategy at an early development stage for example the patent stage. Activities with high investments involved need time to plan (for example build fibre networks), and high investments reduce profit for a long time. New large-scale competitors need time to enter the market because of high investments needed to build an own network (high barriers of entry into the telecom market). Incumbents react slowly on such investment intensive activities from competitors, as they know they have much time to adapt. This applies also for other countries. This can be seen in the significant parameter for V2 (“Profit”) from V1 (“New Entrants”) (V1.I3 at lag 3). Smaller competitors influence the profit of some of the departments (for example mobile phone), but their direct influence cannot be seen in overall firm profit data. Big 4 do quickly adapt to actions from their direct competitors, as for example new mergers (changes in number of “New Entrants” V1), which is reflected in the significant parameters for V2 from V1 (V1.I1, V1.I2 at lags 1 and 2) in the lag 4 VAR model. Some firms are influenced by others’ past performance reaching 4 years into the past (strategy changes, product changes, mergers, market exit). These influences are reflected in the significance coefficients of V1 on lag 4 (Table 6.7, V1.14).

A reason for the actual flat trend of profit is that Swisscom highly invests in the construction of physical fibre networks. Swisscom planned to finish building fibre networks until 2015 (Swisscom 2011e), which is money and time intensive and thus influences its profit. The negative trend and constant of V2 (“Profit”) should be

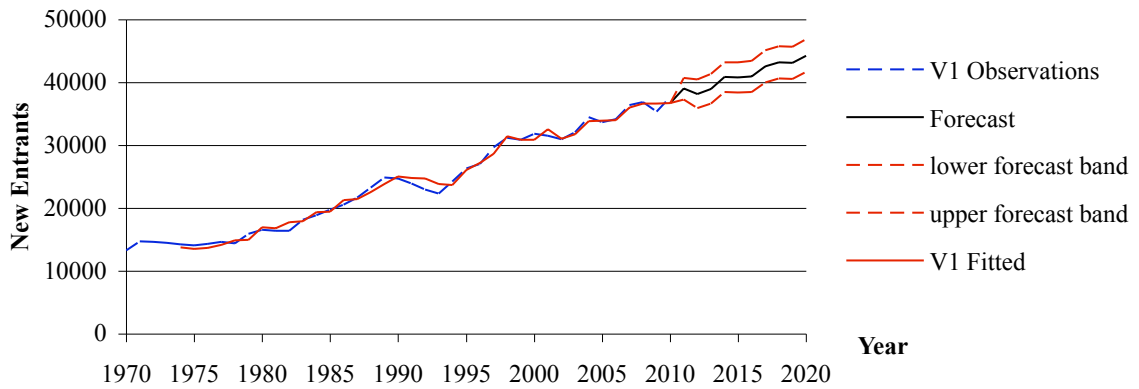
considered along with the S. E. (Standard Error) being higher, thus it cannot be declined that these parameters could be positive as well.

6.5.4 Forecast

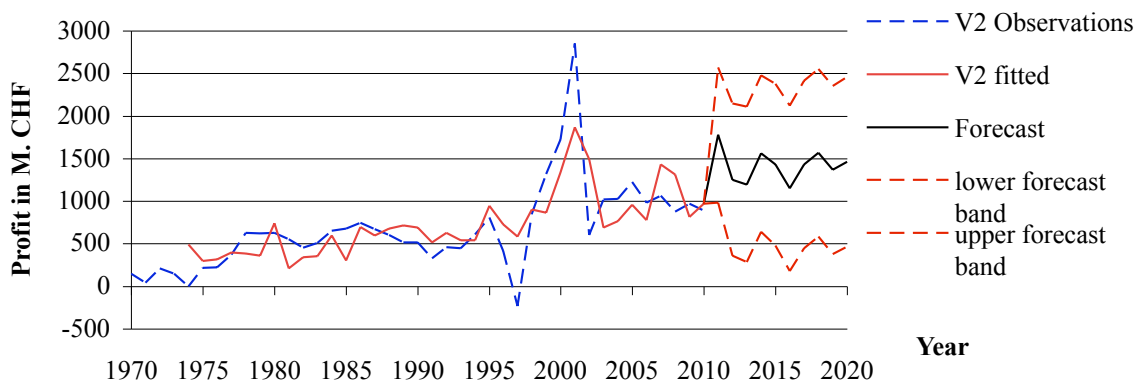
The forecasts show the predictions based on the model estimations with CV of ± 2 S.E.

The external validity of the predictions is limited insofar as the number of new entrants into the Swiss market could change due to bilateral regulations between Switzerland and the European Community. New MVNO could enter the market with new products, new technologies could be developed, or new products could be launched from another side (customers, new entrants, and firms from other sectors). The telecom market is highly dynamic (Section 2.3). Only 40 data points were available reducing the model accuracy (for the data sets, see Appendix X). As shown in Section 2.2, nowadays profit changes are more likely than in the past (before liberalisation). Thus even if older data were available, they would show the picture of the time before liberalisation, which is less relevant to the actual situation and as such would not improve the model accuracy. With these limitations, forecasts are shown in Figure 6.17.

Figure 6.17: Forecast of Series V1 (New Entrants) VAR model lag 4



Forecast of Series V2 (Profit Swisscom) VAR Model Lag 4



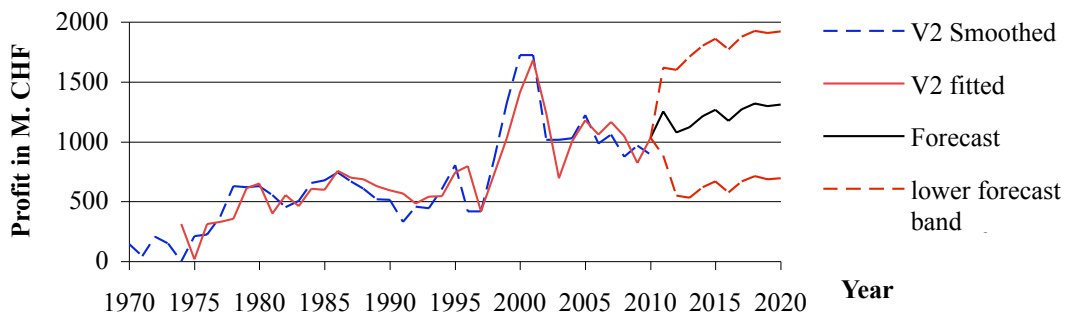
The forecasts were recursively computed using the coefficients of the estimated model. The forecast for V1 (new entrants) showed rather narrow bandwidths reflecting higher prediction accuracy. Forecasts for V2 (profit) showed wider bands reflecting more insecure results but also include upcoming trend changes in the next 10 years. Profit values of 500 to 2,500 M. CHF are expected after 10 years. The trend changes started in 1998 (time point 28) when Swisscom demerged from Swiss Post (PTT). This was the reason the profit became negative at times due to restructuring and high investments. Omitting the period from 1998 to 2005 would be contra intuitive, because many important market changes took place, explaining better what happens now in the market than past values from 1970 onwards (Section 2.2) Instead a sensitivity analysis was conducted as shown below.

6.5.5 Validation of Forecast

6.5.5.1 Sensitivity Analysis Validation

To strengthen the validity of the results, a sensitivity analysis with medians of extreme values was conducted (Bickman and Rog 1998). Medians better suit to smooth extreme values than arithmetic means or linear regression as they do weigh these. The extreme values of V2 were smoothed as follows: $\hat{V}_i := \text{median}(V_{t-1}, V_t, V_{t+1})$. Similar results for smoothed values gave a confirmation of the model choice, and thus improved the validity of the results. Figure 6.18 shows the forecasts of the smoothed model (for the smoothed data See Appendix X Table X.2).

Figure 6.18: Forecast with Smoothened Extreme Values V2 (Profit Swisscom)



The forecast showed a decrease of amplitudes of trend changes, which seemed more likely as the original data, as liberalisation of telecom already took place. A consolidation of profit was observed reflecting Swisscom's rather stable profit development of the last 10 years. The model forecasted a profit increase in line with the linear trend. As the model was now further confirmed the analysed threats from Scenario 1) should be observed and acted on. The smoothed values of V2 (profit) slightly changed the forecast and model fit of V1 (new entrants). The smoothed model predicts profit values of about 600 to 1,900 M. CHF after 10 years.

6.5.5.2 Comparing Forecasts with Posterior Data

The forecast is now compared with the profit data provided posterior for 2014. The non-smoothened model forecasted profit of 1,400 M. CHF in bands of 500 to 2,400 M. CHF

for 2014. The smoothed model predicted about of 1560 M. CHF in bands of 550 to 1800 M. CHF for 2014. Both models predicted a decrease around 2015. Table 6.9 shows Swisscom’s profit data.

Table 6.9: Posterior: Profit Data Swisscom in M. CHF

Year	Profit Swisscom	Profit forecast with smoothed model	Lower band	Upper band
2011	649	1,776	985	2568
2012	1,815	1,252	358	2146
2013	1,695	1,196	284	2107
2014	1,706	1,560	642	2479
2015	Future values	1,430	479	2380
2016		1,150	179	2120
2017		1,432	448	2415
21018		1,568	583	2554
2019		1,367	379	2354
2020		1,464	468	2461
2021		1,776	985	2568

The decrease from 2011 was predicted in the model for 2012, which was rather accurate. The smoothed model derived 8.5 % from the actual value for 2014 indicated with yellow in Table 6.9 above.

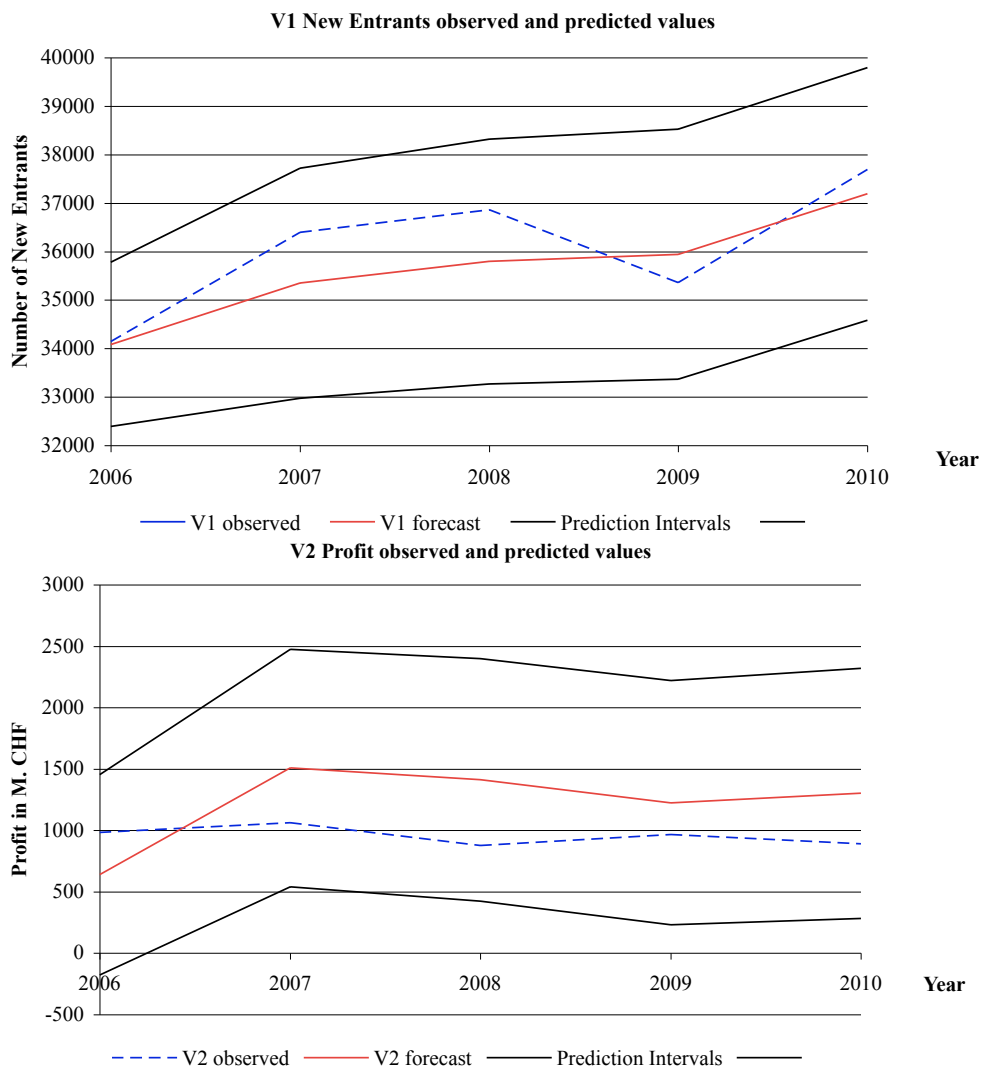
$$\left(1 - \frac{1,560}{1,706}\right) \cdot 100\% = 8.6\%$$

The actual value (1,706 M. CHF) was within the prediction interval of the model [642; 2,497] M. CHF. Recalling that the model just included new entrants in the Swiss market and profit of Swisscom, the profit prediction appears as rather accurate.

6.5.5.3 Back Prediction Validation

A comparison with forecasted values for 5 actual values of the lag 4 VAR model with trend and constant was done in order to see, if predictions would hold for the values (Evans 2015). Figure 6.19 shows the results. Both forecasts of past values are rather close to the observations. Also both forecast partly above and partly below the observations, thus there is no tendency to forecast always too high or too low values.

Figure 6.19: Forecast V1 (New Entrants) and V2 (Profit Swisscom) 2006 to 2010



6.5.6 Overview of Results

The results showed that the variable number of “New Entrants” help to predict the variable “Profit” of Swisscom. A model specification based on unit root test (stability, and decline of cointegration of variables), ACF, and PACF (lag order specification), number of data points, and economic considerations led to the choice of a lag 4 VAR model with trend and constant. As a result of the model specification a forecast was computed. For V1 (new entrants) a rather linear trend with an upward slope was forecasted, and for V2 (profit Swisscom) trend changes as a result of liberalisation. The sensitivity analysis smoothed the extreme values and refined the forecast for V2

finding consolidation of profit explained by markets being more stable than during privatisation. It is expected that the sensitivity analysis is of higher predictive quality as Swisscom cannot undergo another privatisation process and thus will not have such extreme peaks in their profit data in the future. The upward forecast slope for the variable V1 confirmed scenario 1). The validation of the model showed that it holds true for the backward prediction interval for the years 2006 to 2010. Thus the model behaved in a stable manner, which increased the likelihood that the model choice was accurate. Comparing forecasts with posterior values for 2014 confirmed this. The test for normality of the residuals further confirmed the model choice. Thus the number of new entrants (V1) can be used as an indicator variable as an output from the scenario analysis. The VAR model choice represents a way to calculate trends of identified indicators without choosing a dependent and an independent variable. This has the advantage that the time series data of both variables can be modelled together, thus analysing the accuracy of their conjoint development instead of trying to show a statistical causality. Nevertheless, the VAR model allows us to identify whether one variable helps to explain the behaviour over time of the other one. Sensitivity analysis and back prediction validation helped to support the validity of the conducted time series analysis, thus, if the VAR model served to provide accurate predictions in the past, and if the model holds true for smoothed values, this suggests validity. In this case, both backward prediction and stability within smoothed patterns were present in the results, indicating a valid pattern and leading to the most logical scenario in terms of future direction of the market.

6.6 Implications from Scenario Analysis

Scenario 1) 'technology driven world' was identified as the most probable one with the identified indicator 'new entrants'. This scenario is relevant for the telecom sector as a whole even though, due to data restrictions only the example of Swisscom was applied to provide a prediction analysis using a VAR model. This would suggest that the CI analysts should be aware and strongly focused on new entrants as a critical factor in present and future CI activity. If, however, we look at Table 6.2, generated as part of the Porters Five Force analysis on page 171, we see less reaction to new entrant and a greater level of competitive response to existing competition.

6.6.1 Analyst Attitude and Response towards New Entrants

Table 6.10: Analyst Attitudes towards New Entrants

Attitude in responses	Commentary
<i>“Disruptive, of course, yes, as you said. You always have to watch what other technologies are doing, so new technologies are coming to the market. So this is may be one two years ahead.” (Analyst 1, Swisscom, date of interview 12/02/2010)</i>	Indication of market disruption but just concerning technologies
<i>“What also occurs is that for example one looks at frequency licence auctions, who is bidding, and to whom the licence goes. If these are well known firms from the market this is fine, otherwise one thinks about, if these are new entrants.” (Analyst 2, Swisscom, date of interview 14/04/2010)</i>	He explained that he observed possible new direct competitors but he was not concerned about them, as the entry barriers are high.
<i>“There are certain technological developments coming out from Swisscom, which are researched and then patented, but we do not screen all areas of the IT and telecommunication market.” (Analyst 3, Swisscom, date of interview 14/04/2010)</i>	He emphasised technological developments.
<i>“If one of our competitors wants to move into a new technology, this might be a danger for us, if we are not competitive without that technology in the future.” (Analyst 4, Sunrise, date of interview 01/10/2010)</i>	She emphasised technological developments from competitors.
<i>“Early warning also on this side would typically be new competitors, new Mobile Network Operators (MNO). It is unlikely to happen, we are unlikely to see someone else coming, and buy and built a new network, besides, that would be probably huge, very huge. However what could be coming are mobile virtual network operators (MVNO).” (Analyst 5, Orange, date of interview 20/10/2010)</i>	He described that he watched MVNOs and the threat from them, as they could offer their services to all four firms and sold to the highest price.
<i>“Actually in Switzerland it is then Sunrise, Swisscom, and Orange, and then all the others like MBudget, the Coop offer, Red Bull, because they are kind of MVNOs. Google is more competitive to phones like Nokia, Ericson, and iPhone (Macintosh). But Red Bull for example is kind of MVNO on the Sunrise network and they offer their own price plan their own handsets, and their own contract to Swiss customers.” (Analyst 6, Cablecom, date of interview 10/11/2010)</i>	The operational analyst was aware of MVNO but did not emphasise to watch them. When asking him explicitly what kind of information he was looking at regularly he did not mention them.
<i>“Every operational leader has in his responsibility ... to share the information with the relevant parties, and addresses it to the senior management, if it is important. ... if there may be competitors launching special projects ... we get this from our sales people, so every business unit is focused on ad hoc early warning indicators.” (Analyst 8, Cablecom, date of interview 29/12/2010)</i>	He emphasised that every unit was concerned with screening the market, but did not emphasise MVNO. The operational analysts focused on this.

We can now examine, based on interview data, the attitude of the analysts of the four large-scale Swiss telecom firms in order to evaluate analyst response further. Table 6.10 above shows analyst attitudes towards data gathering with predictive purpose. Analysts

from Orange and Cablecom appeared to watch indirect competitors such as MVNOs, while Swisscom and Sunrise appeared to monitor technological developments. Even though there is some evidence that they observed new entrants, the main focus of the analysts was on new technologies (potential substitutes) and new product offers from established MVNOs.

The responses to activities of potentially new competitors are part of CI Content, as responses are based on recommendations from CI analysts on how to act – thus reactions of the analysts demonstrated their choices of indicators. As shown in Table 6.11 below, the main indicator data appeared to be gathered in relation to rivals with a view to comparison of competitive position.

Table 6.11: Self-assessment of Reaction on Market Changes from Checklist

Analyst	Reaction on new competitors
Swisscom strategic analyst 1	Intensively watching
Swisscom department analyst	This depends on the strategy of the new competitor, but we will not become embroiled in price war, if it is possible.
Swisscom strategic analyst 2	Depends on the market entry strategy of the new competitor. Entering the core market of the new competitor.
Sunrise strategic analyst	I do not know
Orange strategic analyst	Analysis of Swiss market impact, USP, check if products appeal to customers.
Cablecom strategic analyst	Analyse threat, adapt technologies and services to counter

In assessing how they reacted to new competitive threats in 2010, variable patterns emerged. While Swisscom indicated their readiness to react, and Orange and Cablecom appeared to have a clear idea what they would do if an MVNO enters the market, Sunrise’s analyst acknowledged that she was not aware of what to do.

The focus of the four firms was largely on actions of main competitors instead of new products/services or own innovations. Yet, diminishing innovations indicate a danger within the scenario of a ‘technology driven world’. High investments (Swisscom: fibre network) help to sustain the core assets, but the core activities are still threatened as the bidding process can include new MVNO partners, and special offers can be made to gain new customers. Chapter 2 showed that Swisscom included innovation in its strategy (Swisscom Strategy 2014). One aspect of this strategy is visible within

Swisscom Ventures department, which invests in innovative start-ups with strategic significance (Swisscom Start-up 2014). It remains unclear how far Salt. (formerly Orange), Sunrise, and Cablecom include innovation.

The VAR model predicted profit of Swisscom is to decrease in 2015. Their actual profit data in 2015 show evidence of this decrease. Even though Swisscom is the only firm in the Swiss telecom market, which conducts scenario analyses, they focus merely on available technologies and less on possible future market disruptions. The other three firms did not conduct scenario analyses. Although they are powerful physical network holders, for the large-scale Swiss telecom firms, Scenario 1) implies the disruptive innovators such as MVNOs (Mobile Virtual Network Operator), Google, and customers appear to be creating the real innovative value in this market.

Swiss telecom firms should increase innovative activities to sustain position against market disruptions in line with Scenario 1) 'technology driven world'. They could strategically push technologies and play the role of disruptive innovators. Interpreting the results from De Man *et al.* (2009) for Scenario 1) implies that companies push their R&D departments to reduce the danger of disruptions from vendors and clients overtaking innovative activities. Both indications as low-end investments in the market (indicating that incumbents enter the market) and own rising R&D costs confirm Scenario 1).

6.6.2 Need for Dynamic Predictive Analyses as part of Future CI Activity

As part of the consideration of CI Content, the selection and use of analysis tools is a key element as identified by Fleisher and Bensoussan (2003; 2007) (see Section 3.5). In the discussion of the use of analysis tools, the joint use of static and dynamic perspectives was identified as critical in CI activity (see Figure 6.2). Nonetheless, when looking at the patterns to emerge from the analysts' own indication of analytical tools or systems being used, a varied picture of degree of dynamic analysis emerged. A checklist was used asking them which systems they used for distinct analyses and their indications are noted in Table 6.12.

Table 6.12: Self-assessment of Information Systems for Analyses from Checklist

Firm's Analyst (q9)	SWOT	Five forces model	Other analyses
Swisscom 2010	CIS, MIS, DSS	CIS, MIS, DSS	None
Sunrise 2010	PowerPoint, Excel	PowerPoint, Excel	None
Orange 2010	CIS, MIS	CIS, MIS	CIS (Pricing analysis); No tool (leaver approach)
Cablecom 2010	CIS, MIS, KM, DSS	N. A.	Excel (financial Scenario-Planning); MS Office for Successes, Failures, Opportunities, and Threats (SFOT)

Acronym: Competitor Information System (CIS), Management Information System (MIS), Mathematical Modelling System – also Excel spread sheets (MMS), Knowledge Management System (KM), and Decision-Support System – also human support (DSS).

Respondents from all firms other than Sunrise used CIS (Competitor Information System). CIS supports analyses of external threats and opportunities, which leads to SWOT analyses. Sunrise's respondent relied on SWOT and Porter's Five Forces analyses, using excel spread-sheets. She took relevant information from another source than CIS (for example company reports). The respondents of Swisscom used Porter's Five Forces analysis and used CIS to supply market data. The respondents of Orange and Cablecom indicated that they developed calculations by either using Excel spread-sheets; and used MIS, which supports financial analysis. For instance, Orange's pricing analysis was comparative – relative to external information about competitors, with supporting CIS.

In summary, at the time of this study (2010), despite their resources, the majority of the CI analysts relied on relatively static analysis tools, with limited adoption of more dynamic forms of externally-oriented CI analysis. Where a couple of analysts indicated that they adopted other tools beyond this (Orange and Cablecom), one key reason was the support of headquarters, which supplied forms of analysis through portals. Orange's respondent said:

*"[From our] group level **France Telecom** we have a big portal with lots of information for all the trends and tendencies in the market being usage, attitude, new product, new devices, new services, emerging products successful in other markets. And that is a very rich portal ..., with all the information that you can think of."* (Analyst 5, Orange, date of interview 20/10/2010)

However, analysts seemed to think this was the responsibility of headquarters to develop those systems, as Cablecom's strategic analyst explained:

“So Amsterdam needs to change and adapt and improve the systems more than we can do it from here.” (Analyst 7, Cablecom, 29/12/2010)

With *Amsterdam* he referred to UPC-Cablecom's European main site.

In terms of more dynamic analysis tools, while both Cablecom's executive assistant and Swisscom's analyst indicated the use of human decision support, there was limited evidence of this and the patterns on feedback loops within CI activities were contradictory (see Appendix IX.1). Cablecom appeared to focus on some financial scenarios for short-term goals indicated as *scenario planning*, only one firm (Swisscom) reported the adoption of dynamic scenario analyses.

The adoption of more dynamic analytical tools is clearly an area for investment in future CI activities for all four firms. This may start as extending the existing tools to be more flexible – for instance, amending the Five Forces model with additional elements, such as market regulations, as suggested by Aktouf (2008), Andriotis (2004), and Flower (2004) is relevant for a holistic perspective in conjunction with analyses of internal forces. Alternatively, it can, in those firms with more developed CI structures, involve a combination of static and dynamic analytical tools, as suggested by Dulčić *et al.* (2012). This should overcome the static nature of existing tools and offer greater CI evidence for useful future prediction. This is further considered in Section 7.4.2.

6.7 Summary of Chapter

This chapter offered a market context analysis of the Swiss telecom market. Section 6.2 identified the importance of predictive analyses for the Swiss telecom firms. Section 6.3 used Porter's Five Forces analysis to demonstrate the competitive situation in 2015 and then considered how firms were addressing those patterns, based on findings from checklists (see Table 6.2) and interview data. CI analysts tended to focus on the competitive threats from current competitors – an indication that other threats could possibly be underestimated. The scenario analysis of the telecom sector as developed in Section 6.4 identified Scenario 1) 'technology driven world' as the most probable one.

Recalling that the analysts were less concerned about new entrants from other industries, this scenario offered a substantial threat in 2015. A follow up interview with Swisscom's strategic analyst conducted in 2015 has shown that this threat has materialised and become very relevant. He mentioned that significance of this threat:

“New competitors, such as OTTs [Over The Top providers offer services for direct consumption such as voice messaging, TV and music and cloud solutions for storage purposes, across networks and providers without subscription (Digiday 2015)] – often showing disruptive business models.” Analyst 3, Swisscom, date of Mail (10/11/2015)

In Section 6.5 the scenario analysis was applied to Swisscom in 2010 to provide and validate a forecast. Comparing the forecasted profit values for Swisscom at the time of this forecast in 2010 with actual profit in 2015 has shown that the prediction was very accurate. Section 6.6 discussed implications from the scenario analysis for the telecom firms. Swiss telecom firms need, as Leavitt *et al.* (2004) advocated, to align their organisational direction to deal adequately with factors driving environmental turbulence. Following the logic of Scenario 1), two main issues were found as relevant for the firms. First, the need to increase efforts in R&D activities, and second, to include more substantial future-directed analyses in their CI Content by supplementing static and comparative analyse with more dynamic, predictive analyses that can address the broader market trends, in particular the disruptive market changes.

Chapter 7: Discussion

7.1 Introduction

This chapter discusses the findings of this PhD study and draws out how the findings link to past research and how they have generated significant new insights into CI in practice at firm level. Through the operational lens, **Section 7.2** considers what the findings have shown about the level of development of CI in firms, thereafter the section discusses the issue of effectiveness and sophistication in decision-making, outlining some key areas to be taken further. Through the organisational lens, **Section 7.3** examines how CI links to organisational patterns at firm level. In particular, the discussion clarifies how explicit and implicit approaches in CI are linked to organisational structure. A framework for representing the mapping of organisational patterns with CI Activities is presented. The section then considers how strategic and operational emphasis and analyst roles are accountable for variations in CI approaches, outlining how this relates to strategic attitude in firms. The strategic lens, in **Section 7.4**, considers in detail what the findings have shown about CI and Decision-Making.

7.2 Operational Lens: Level of CI Development and CI Activities

7.2.1 Level of Development of CI Activities as manifest in Operational CI

Previous research has presented CI as a modular process, with a stepwise implementation (Prescott 2003; Dishman and Calof 2008). Best practise frameworks have identified three or more levels of CI development in firms (BABOK 2009). This study takes a different approach by defining just two levels of CI development, based on the findings. The basic level applies to firms starting to develop a new CI process, while the advanced level reflects companies with a developed CI process. What is useful in this approach is that levels can be identified within specific CI activities e.g. Data Analysis in CI Content or analyst team organisation in CI Organisation. In the case of a less developed analytical approach, which was evident in the findings on CI Content in Section 5.6, the level of data analysis is likely to be more static in scope, simply because required information systems might not be present. In a similar way, for firms who are

just starting to develop CI in their firms, the analyst team planning might be piecemeal – in one firm in this study, the CI Analyst role was only a part time role.

A CI process is seen as effective, if analysts' CI output impacts strategy – this was seen to some extent in the degree of involvement of analysts in the strategy process (see Section 5.5.2). CI analysts communicate outputs to management and engage to some degree in recommendations for management. However, we noted that not all firms could achieve this level of linkage between practical CI analysis and management insight. CI activity appears to link to firm strategy in a minimal way in firms with emergent CI by presenting analytical patterns gleaned from data in a relatively uncomplicated manner (e.g. not engaging in priority setting). There were few instances where there was input to the definition of alternative decisions based on market data and they occurred only for major CI projects (see Section 5.6.3).

Furthermore, some CI activities have higher priority; both CI Management and CI Content are likely to have more emphasis in a firm just developing CI processes than other CI activities. Priority given to specific CI activities depends on the importance of each activity in relation to others, as shown in Table 7.1 overleaf, which describes different patterns based on level of development. In a developing CI process, a basic form of CI Organisation might nonetheless link with more advanced information system use, if, as was the case for Orange, there was access to the headquarters portal (originally this was France Telecom). A more developed CI process, as in the Cablecom case, was still at a rather low level in terms of perceived sophistication (see Section 5.4 and Appendix VIII on Table VIII.5). Basic or advanced levels of CI Management and CI Organisation do not appear crucial for CI output. An advanced level of CI Content needs to be established in order to reach an advanced level of CI Synthesis, which is associated with the effect of CI on decision-making. However, a basic level of CI Management implies starting with a basic level of CI Synthesis. In terms of organisational support, findings suggest that a CI team typically starts by aligning its CI process to provide meaningful analyses, and then getting the necessary organisational and system resources for it.

Table 7.1: Overview how CI Activities work together based on level of CI development

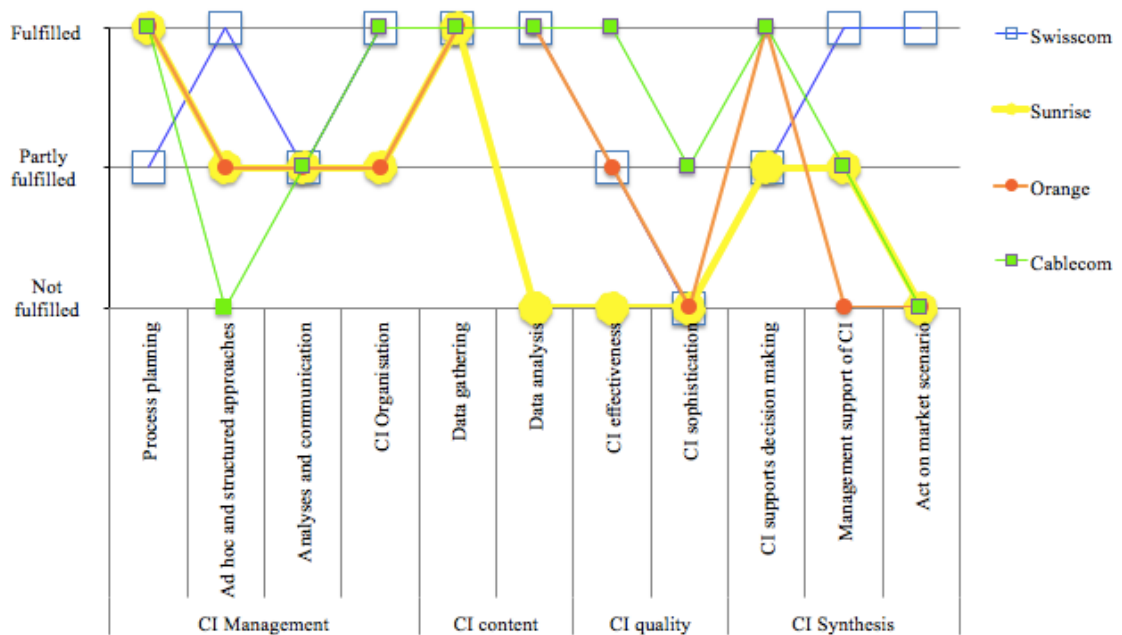
CI Activity Level	CI Management	CI organisation	CI Content	CI Quality	CI Synthesis
Basic CI process in development stage, central CI approach	<ul style="list-style-type: none"> Analysts develop the CI process CI team and information is core to the process 	<ul style="list-style-type: none"> The analysts have access to information systems The central CI team is organised, they are identified as the prime source for CI analyses 	<ul style="list-style-type: none"> Vision is either focused or just peripheral Indicators are identified but just reported (alert) 	<ul style="list-style-type: none"> Output depends on the relevant information from the CI team CI Process development to reach better analysis results 	<ul style="list-style-type: none"> Some resources available for a small CI team Part of the CI information for decision-making is provided in house part from secondary sources or from headquarter, which are not applied
Advanced CI process developed, de-central CI approach	<ul style="list-style-type: none"> CI process is planned and continually developed Consider use and usefulness of elements 	<ul style="list-style-type: none"> Sophisticated information systems tailored to firm The CI approach has a strategic function and CI teams in all important departments 	<ul style="list-style-type: none"> Focused and peripheral vision Interpret indicators, recommendations Identify priorities from market context i.e. scenario analysis 	<ul style="list-style-type: none"> Monitor CI Process effectiveness: query, success, interface Monitor CI Process sophistication: relational channels, systems fit needs 	<ul style="list-style-type: none"> Analyses support management decision-making. As a result CI supports firm performance Management issues resources for CI. As a result the CI Process or some elements is continually developed
Description	Is it <i>important</i> to align elements for all stages of CI process development	Technology is <i>not core</i> to the process, but required for data and communication management, hence a basic level can be combined with the other CI activities on an advanced level	The results of the analyses <i>depend on</i> : <ul style="list-style-type: none"> data quality ability of analyst resources to provide analyses (time, systems, experts) Analyses are core to the CI process providing output	CI Quality monitors the CI Process, it is apparent that lower CI quality provides inferior results than a higher CI quality. CI quality is a <i>supporting process</i> . CI analysts should keep track of it	That the <i>CI team influences management decision making</i> with its output appears the aim of the CI Process. Nevertheless it appears relevant that CI issues (market information) are prioritised against other relevant topics of the firm (finances, production, other internal processes)
Past research	Leavitt <i>et al.</i> 2004; Dishman and Calof 2008	BABOK 2009	BABOK 2009	BABOK 2009	Wright <i>et al.</i> 2009

Basic levels are **coloured in green**, advanced levels are **coloured in yellow**. The shaded cells in Table 7.1 indicate recommendations on how best to match CI activities.

7.2.2 CI Quality: Need for Adaptation of Systems and for greater Networking and Feedback

Consideration of effectiveness and sophistication of CI Activities was undertaken in Section 5.4. Table 7.1 above identifies, in a cross case analysis, the patterns that were evident in showing how each firm self-assessed their processes on indicators of effectiveness and sophistication. Figure 7.1 summarises how the Swiss telecom firms meet the criteria for an effective CI Process notes some key weaknesses of the firms (based on Tables VII.1 through VII.4 in the Appendix VII).

Figure 7.1: Summary of Effectiveness in CI Activities for Swiss Telecom Firms



- CI Management planning: Swisscom
- CI Management ad hoc and structured approaches: Cablecom
- CI Process enabling to effectively communicate analyses: Sunrise, Orange
- CI Organisation: Sunrise, Orange (partly fulfilled)
- CI Content data gathering: all fulfilled
- CI Content data analysis: Sunrise
- CI Quality Effectiveness: Sunrise
- CI Quality : Sophistication: Orange
- CI supports decision making: Swisscom, Sunrise (partly fulfilled)
- Management supports CI: Orange
- Providing market scenario to act on: Sunrise, Orange, Cablecom

In considering aspects that have emerged from this research as most significant, Table 7.2 summarises two key areas for effectiveness and for sophistication respectively.

Table 7.2: Relevant Indicators of Effectiveness and Sophistication to emerge in the study of Process and Systems

Key Elements that show Effectiveness		Author
Is CI Process fit for purpose?	Identify users and their <i>roles</i> , responsibilities, needs and capabilities	McIntosh <i>et al.</i> 2011
Are Information Systems adapted?	Query based: <i>what problems</i> are to be solved? Systems are adapted and adaptable to users' roles	ISO2008; BABOK 2009; Hannig 2002
Key Elements that show Sophistication		
Communication frequency with potential for Networking	<i>Communication</i> and understanding between management and analysts support strategy	Johnson and Lederer 2005
	<i>Networks</i> support organisational learning	Rulke 2000
System Capabilities	External and internal balance in info sources, embracing qualitative and quantitative, contextual focus and internal strategic needs adequate outputs (documentation)	Evans 2012
	System support for filtering, monitoring, and distributing data to relevant internal clients Good system links	McIntosh <i>et al.</i> 2011; Gibbons and Prescott 1997
	Intended users use CI process for intended purpose through integration of need and outcomes	

In considering effectiveness, a CI process appears fit for purpose, if it allows analysts to deal with the tasks associated with CI, which are to provide analyses of their market (McIntosh *et al.* 2011). McIntosh *et al.* (2011) emphasised that information systems have to be *adapted* to the CI analyst roles, and systems should be adaptable to different user needs. In the findings, the information systems of the firms appeared to fit with their actual CI development stage – for Orange this covered analysis using systems through a HQ portal, for Sunrise, it centred on knowledge management, and for Swisscom and Cablecom, it involved a mix of standard systems available across the business (through intranet portals) and some adaptations of standard systems as appropriate. While McIntosh *et al.* (2011) suggested following a query-based approach to CI – in practice, Swisscom was the only firm emphasising query-based techniques, with some tailored locally-adapted CI projects based on specific management information needs. Analysts who work in a query-based way can set a good standard for effectiveness, because of the strong fit to client needs (ISO 2008). For system

adaptation, this indicates a need to provide systems that manage data in a way that fits analyst needs (Hannig 2002).

In considering sophistication, two elements that emerged as having practical value for both developing CI processes and developed CI processes were: a) communication frequency and potential for network building and b) balance in the use of system capabilities. Johnson and Lederer (2005) emphasised that *communication* frequency enhances mutual understanding between management and analysts, while Rulke (2000) emphasised the importance of *communication* for *organisational learning* (noted as linked to networks). The data from the cases has shown that regular communications (vertical) are a feature of HQ-centred firms, but that across all firms the CI analysts speak in articulate ways about communication that they feel is appropriate (see Section 5.3.2). In considering Leavitt *et al.*'s (2004) work, this PhD has drawn attention to the importance of communicating structures in three areas: first how the communication structures shape specific CI analyses, as shown in the quote below:

*“You have an **ad hoc part** [to communicate] for more the confidential, the strategic projects, as well as more the impact of competitor product launches, things that you cannot forecast or anticipate.”* (Analyst 5, Orange, date of interview 20/10/2010)

Second, the study has illustrated the importance of communication of the specific CI contribution at a strategic level and that ad hoc communication can be as effective as structured communication in this regard, as identified below:

*“Usually [analysis from the competitor] will be part of a presentation, or a documentation, you have to make as an outcome of this project a final report, and your contribution, **the CI contribution**, will be, I don't know, **Chapter 6 or so.**”* (Analyst 1, Swisscom, date of interview 12/02/2010)

Third, the study has noted that prioritisation processes typically require more structured communication channels, as shown below:

*“The outcome of the **prioritisation process** of project reviews for example is largely communicated through **formalised meetings.**”* (Analyst 7, Cablecom, date of interview 29/12/2010)

Where ad hoc communication occurs for issues with potentially high impact on strategy, formalised meetings characterise prioritisation processes where the selection of CI projects that will be pursued occurs.

It must be noted that criteria for effectiveness and sophistication may vary with the development stage of the CI process. In considering how communication approaches enable network building – this seems a tacit, underplayed part of the analyst role and it seems to link to level of analyst experience. Firms that develop good CI networking appear to have a decentralised CI process, as such networks develop through time, as noted by the Swisscom analyst. Networking activity increased with a more developed stage of CI processes, with examples of the deliberate feedback loops to gain more interaction with departmental information needs. Gnyawali and Madhavan (2001) found that networks offer a strategic advantage to firms at any stage of development. In line with their argument, a CI team that focuses on developing networks has an advantage. Findings in this area suggest that in the two firms with the more developed CI activities, analysts can be involved with decisions through networking but also through learning through *feedback*. Campbell (2004) identified key components of a robust CI methodology as: “*Design and setup; information collection; analysis; dissemination; feedback (system reset)*.” For firms with developed CI processes (Swisscom, Cablecom) feedback systems were better established than in those with developing CI processes (Sunrise, Orange). This pattern echoes Viitala's (2004) belief that feedback from leaders enhances the learning process of analysts about decision preparation.

Firms with more established feedback processes appear also to be active in CI networking. Swisscom reported a network of actors, from whom ‘deliberate’ feedback was sought, with continuous contact between teams- in this way, of all four case firms, the firm seemed closest to a *learning organisation*. Cablecom, in contrast, had a more structured communication with defined meetings, lengthy strategy planning procedures, but analysts had to *ask for feedback*, suggesting that feedback planning was in a development stage. In terms of developing CI processes; Sunrise analysts got ad hoc feedback and were active at regular management meetings involving ‘*brain storming*’, a feedback process that was more developed than that of Orange.

In terms of evidence of system capabilities i.e. using systems well, *firm centred* approaches benefit from more *management support*, as more resources are provided for the CI processes (Swisscom, Sunrise), although they lack structured systems. Sunrise

reported management support, but their strategy process is quite narrowly defined, with only a few ad hoc elements – analysts felt that CI could deal with more relevant issues. For more developed CI process, *system capabilities* also reflect how capabilities are adapted so that analysts use a range of systems/sources for distinct data management purposes and that relevant data can be shared in a timely way across systems. Thus, the breadth of data gathering and the interactivity with relevant sources/experts in the business system seem to be key areas for improvement in terms of building greater sophistication into the CI activities of the firm.

7.3 Organisational Lens: Characteristics shaping CI Processes

The analyses in Section 5.5 identified a number of organisational patterns that had impact on CI activities; the difference in *CI development*; the *structure of CI process*, namely centralised vs decentralised; and whether there was a *headquarters or firm-centred* focus in CI activities. Where this variation in organisational characteristics was most evident was in a) the adoption of explicit or implicit CI approaches and b) how organisational characteristics influence CI practice.

7.3.1 Relationship between level of CI Development and extent of Explicit and Implicit Approaches in the CI Process

Explicit approaches are characterised by developing information systems with a focus on systematic companywide or predefined CI procedures, while implicit approaches apply mostly tacit knowledge and adopt more CI flexible procedures. We have seen the basis of past thinking on implicit and tacit knowledge (Miller 2008; Nonaka and von Krogh 2009) in Section 3.4. What also needs to be considered is knowledge conversion, as outlined by Nonaka (1994) “*knowledge conversion explains, theoretically and empirically, the interaction between tacit and explicit knowledge*”. Hernández Sánchez, Hernández Sánchez, Collado-Ruiz and Cebrián-Tarrasón (2013) elaborated on the idea of knowledge interaction, noting tacit and explicit knowledge to be **complementary**, claiming, “*Explicit knowledge without **tacit insight** quickly loses its meaning.*”

It is therefore worth identifying how level of CI development can shape explicit and implicit choices for each of the CI Activities. Table 7.3 summarises how explicit and

implicit approaches appeared to shape CI Activities in this study and can be relevant in other service organisations.

Table 7.3: Explicit and Implicit Patterns that shape CI Activities at Firm Level

Explicit Approach	<p>Structure of CI Process is highly planned but may cover many areas</p> <p>Reporting through standard regular documentation</p> <p>Communication between CI team and other departments (strong vertically)</p>	<p>CI Management (see Section 5.3)</p>	<p>Structure of CI process is organic, less systematic but may be more focused in scope</p> <p>Less standard reporting and less documentation</p> <p>Communication filtering through to different department in a regular basis (strong laterally)</p>	Implicit Approach
	<p>Effectiveness through well-developed processes for generating CI outputs that are comprehensive and match firm-market interests</p> <p>Sophistication through established structures for planning, for dissemination and for strategic planning (e.g. priority setting)</p>		<p>CI Quality (see Section 5.4)</p>	
	<p>Structured information systems for generation of data</p> <p>Central CI team</p> <p>Companywide focus (HQ)</p>	<p>CI Organisation (see Section 5.5)</p>	<p>Structured information systems combined with adaptation for tailored queries/identified needs</p> <p>Decentralised teams</p> <p>Firm and issue focus</p>	
	<p>Use of standard analysis toolboxes (can be powerful) Managed by CI analyst</p> <p>Linear approach in data input, transformation-output</p> <p>Link of CI with a predefined strategy planning process</p> <p>Structured reporting (presentation to management and regular reports)</p> <p>Individual feedback- analyst to manager</p>	<p>CI Content and CI Synthesis (see Section 5.6)</p>	<p>Less rigid approaches to analysis involving mix of standard and ad hoc techniques. Might include other users</p> <p>Data transformation linked to identified management issues</p> <p>Link of CI in a more flexible strategic planning process</p> <p>Varied reporting – with continuous feedback to the internal clients</p> <p>Elements of a Learning organisation</p>	

In CI Management, a newly assigned CI team (as in Sunrise) that is developing their CI process, use explicit reporting of defined tasks, with documentation on CI activities. Analysts involved in developed CI processes, although they used systems such as Clarify (Cablecom), when examining their interview transcripts, they mostly chose their own form of analysis dependent on management query and reported in relatively implicit ways, noting that multiple actors are involved in discussing how CI output linked to decision choices. Findings have also shown that implicit feedback is important to enable analysts to refine their CI output for internal customers (see Section 5.5.4.2).

Regarding CI Organisation, explicit *standardised* systems or portals were used for both developing and developed CI processes. A more implicit approach was the use of *tailored* systems, which required CI analysts to explain to internal clients how to use systems to retrieve information. Two respondent quotes illustrate this variation:

Explicit: “*We share [available information] with people concerned at Cablecom in a structured manner.*” (Analyst 7, Cablecom, date of interview 29/12/2010)

Implicit: “*So the information we used in our CI world will not be stored very heavily.*” (Analyst 1, Swisscom, date of interview 12/02/2010)

Regarding the link to strategy, it is difficult to draw conclusions – explicit reporting of CI sometimes fed into predefined strategy processes, whereas implicitness seemed to accompany a more flexible link to the strategy process. In terms of communication, this seemed to be related to corporate style, where Cablecom had structured meetings, but Swisscom noted a range of less formal approaches – however, both were at a developed stage of CI and emphasised networks and deliberate feedback.

7.3.2 How Centralised or Decentralised structure might influence CI Practice

In addition to variation in explicit and implicit approaches, other organisational characteristics were linked to CI process variation. Britton *et al.* (1997) identified *decentralised* approaches as of benefit for system development and continuous learning. In considering the work of Britton *et al.* (1997), findings from interviews and checklists (Chapter 5) identified a tendency for two firms with developing CI process adopted centralised CI teams and used mostly explicit approaches in analysis. Both Sunrise and Orange had small departments; Orange had a framework to get sophisticated analyses

for compatible results with *headquarters*, but the approaches were not adapted for the Swiss telecom market. Firms with more developed CI process reported the presence of decentralised CI teams and pursued a mix of explicit and implicit approaches, notably in analysis and in final synthesis. For instance, Cablecom team adapted headquarters analyses to their own market context. Cablecom analysts had access to sophisticated central analyses in the area of benchmarking but developed priority setting analyses for local departmental needs. Variation between firm-centred versus headquarter-centred organisation had impact on the degree of explicitness of the CI process. Further consideration of this variation can be seen in Appendix IX.

In addressing CI process structure for firms in other sectors, a question arises – the degree to which centralised or decentralised approaches might be best when in a beginner CI stage. McIntosh *et al.* (2011) recommended starting small and in the findings, Sunrise and Orange both had small CI teams whose remit was to develop CI process. Michaeli (2008) claimed a *CI centre* is a benefit for firms. He identified a *centre* or islands as professionals, while *guerrillas* and *lonely stars* were beginners. Sunrise and Orange are beginners with small companywide CI centres; the Orange analyst might be regarded as a lonely star. Britton *et al.* (1997) used a systems engineering approach and found that *decentralised approaches* can be a benefit for system development as it can address interdisciplinary, complex issues. Across the four firms, the analysts reported only a limited level of interdisciplinary thinking, although there was frequent interaction with departments. Thus, more data is probably needed to identify the real benefits of a decentralised approach. Much seems to depend on the level of experience and level of adaptiveness of the CI analyst themselves.

7.3.3 Comparative Mapping of CI Process with Organisational Patterns

Figure 7.2 below offers a view of the organisational patterns that map the relationship between organisational structure and the nature of CI activities across the four Swiss telecom firms.

Figure 7.2: Mapping of CI Process and Organisational Patterns

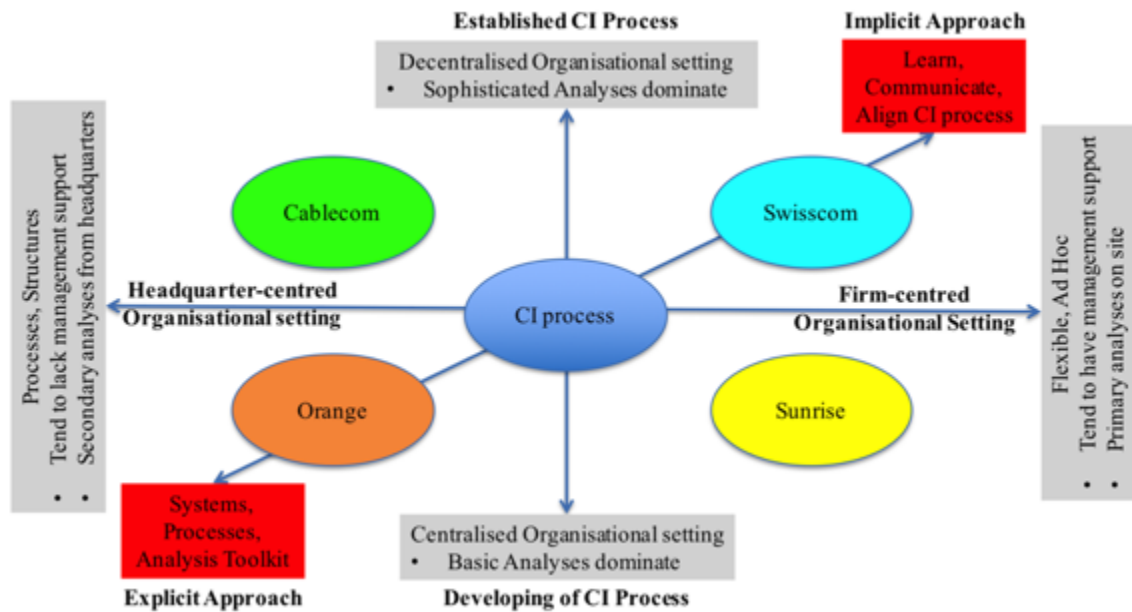


Figure 7.2 shows how certain organisational patterns (e.g. centralised or decentralised) appeared to link to different approaches to CI activities (e.g. degree of implicitness or explicitness in CI process). See findings discussed in Section 5.5.4.

The theoretical considerations on centralisation and decentralisation and on implicit and explicit approaches have been considered in Section 3.7. Findings from the four case firms suggest that CI activities at firm level operate on a continuum and the map is illustrative of the impact of organisational patterns on the scope of CI activities. The arrows denote identified extremes and all four firms sit somewhere between those extremes. Some value in the above mapping for other telecom firms could be that it enables firms to expand their processes appropriately dependent on organisational change. The takeover and merger activity that depicts the current sector suggest that significant organisational reshaping may occur in the future in the Swiss telecom market. For instance, with a more firm-centred support structure for CI, development efforts may centre on flexible team organisation, focus on learning across different systems and the encouragement of implicit communication channels. With global telecom chains (headquarters-centred), CI development needs may centre on developing comparable CI structures that are similar to ensure operational effectiveness – this may logically rely on more explicit systems to support CI activities.

7.3.4 CI Analyst Role: Operational vs Strategic Orientation

The thinking behind what distinguishes an operational and strategic level of CI has been identified in Section 3.7. Notable among those ideas is Wright *et al.*'s (2009) definition:

“[Operational attitude is] *process, revolving around the company as its centre, trying to understand, analyse and interpret markets. Management try to develop positive attitudes towards CI for short-term and personal bonus gain. [Strategic attitude is an] integrated procedure, competitors are identified, monitored, reaction strategies are planned and simulated. [CI] gets top management support, co-operation from others, seen as essential for future success.*”

The findings of this research did not confirm Wright *et al.*'s ideas. What Wright *et al.* (2009) indicated as operational, were considered by the analysts as systematic and part of a strategic approach to analysing the market. Cablecom's strategic analyst explained their approach:

Strategic: “*In the systematic approach we put this information in a report or presentation form, and compare the different indicators from each competitor, like market share, use of subscriptions, churn, or churn subscriptions, sales figures and other financial information, as much as becomes available, for our presentations and reports.*” (Analyst 7, Cablecom, date of interview 29/12/2010)

The findings of this PhD study did not confirm that firms simulate reaction strategies, as suggested by Wright *et al.* (2009), but competitor moves are watched and analysed, as Swisscom's analyst explained:

Competitor moves: “*It can be strategic information, so, if your competitor wants to move in a certain area, so if he expresses interest in a certain company he may want to buy, so it can also be product information for instance a new price of a certain service.*” (Analyst 1, Swisscom, date of interview 12/02/2010)

Ketchen *et al.* (2004) identified strategic issues for CI as market entry; response to a competitive attack; growth; competition or cooperation. These themes were also noted by respondents in this PhD study. The findings agree with Wright *et al.* (2009) that management support is essential for CI, because it makes *resources* available to establish the CI process in firms. Linked to the existence of strategic and operational dimensions in CI is the idea of operational integration, which echoes the ideas behind SE (systems engineering), noted in Section 3.6. Larson (1992) pointed at the importance of operational integration by stating:

“[Operational integration consists of] *dense communications and administrative systems across the internal and external boundaries of the firm that drives decision-making.*”

Operational integration by means of a strong network supports supply chain integration. If this applies for the supply chain, it does for CI as well, as CI supports decisions relevant for the supply chain (i.e. mergers, partnerships). Cablecom's operational analyst put the main emphasis on their communication system when stating:

Operational interaction: *“You can access through this **Etouch** to all adviser portal all the news information available, all the people, all the contacts, **everything**”* And: *“**All ad hoc information** is shared, through this Etouch to all employees.”*

Operational involvement: *“Senior management gives or asks some questions directly live on the Internet and then all appears somewhere in the Etouch and then you can read through again, and then we can **blog or give feedback** to that.”* (Analyst 6, Cablecom, date of interview 10/11/2010)

The intense communication through Etouch allowed the operational analyst to be involved in decision-making, which confirms the findings of Larson (1992).

Strategic integration of CI stipulates how the analyst can contribute to decision-making. Michaeli (2008), when considering CI performance, noted the need for transparency of strategies, achievements and key success factors (*strategic*); cost-benefit monitoring and visualisation (*operational*). In this PhD study, operational and strategic aspects of CI roles were evident, as noted in the example below.

Success Factors: *This program of change involves individual products, in fact all major processes people engaging for the customers, like the ordering, delivery, and billing processes, and all our processes. And all these improvement projects for all these steps in the process, these are measured through green, orange, or red lights.”* (Analyst 7, Cablecom, date of interview 29/12/2010)

Visualisation: *“If the existing competitors change their behaviour, that one **we have to track** as good as possible.”* And: *“We in Cablecom use of course Excel to prepare the information and **make them visible to the management.**”* (Analyst 6, Cablecom, date of interview 10/11/2010)

Tracking key success factors of CI is more far reaching than the above-mentioned program of change reported from Cablecom. Although Cablecom appeared to include key success factors and operational elements, it might not be comprehensive enough to generate dynamic CI outputs. Table 7.4 shows findings for strategic and operational emphasis from the analysts' perspective and summarising the link to past research.

Table 7.4: Strategic and Operational Emphasis on CI

Strategic emphasis in responses: opinions, attitudes citations of analysts	Commentary: what it indicates, links to past studies
<p>“Certain strategic questions are cleared up with different strategic tools. This happens at the corporate level of Swisscom, but also for certain departments or subsidiaries. These questions are very concerned with the competition, with the market, and within this frame, all the collected information flows in.” (Analyst 3, Swisscom, date of interview 14/04/2010)</p>	<p>Emphasis on strategic CI topics on competition, and market (Businessdictionary 2015)</p>
<p>“The ad hoc analysis is more or less regarding the not regular strategic issues, or whenever something comes up at the competitor where he changes his strategy or so.” (Analyst 4, Sunrise, date of interview 01/10/2010)</p>	<p>She defended ad hoc analysis as an important way to analyse changes (da Silva 2012)</p>
<p>We know we have a good understanding about our different parts in the market are playing with those levers [their firm-own analysis approach] (Analyst 5, Orange, date of interview 20/10/2010)</p>	<p>Analyse the market in a limited way (Fink <i>et al.</i> 2004; Tessun 1997)</p>
<p>“Strategic questions with a long-term time horizon, and not the same questions every year. There is basically a contradiction to work on strategic questions every year, but there are always new questions, which are considered in detail.” (Analyst 3, Swisscom, date of interview 14/04/2010)</p>	<p>Respond and adapt strategy to be resilient towards market changes (Michaeli 2008; da Silva 2012)</p>
<p>“Various scenarios can be compiled and then presented to the board of directors. ... Recommendations how to act, which can be derived from it.” And: “It is good to have a good basis of what the competition has done in the past. On this basis the scenarios are developed.” (Analyst 3, Swisscom, date of interview 14/04/2010)</p>	<p>Analyse the market using market scenarios to have multiple views of the future (Fink <i>et al.</i> 2004; Tessun 1997)</p>
<p>“A good story one can narrate [analysis requirements: easy to understand and logically conclusive], so the feedback should be: ‘I would have done it the same way, if I had to do this task.’ ” (Analyst 3, Swisscom, date of interview 14/04/2010)</p>	<p>Expectation of results and feedback from a good analysis (Michaeli 2008)</p>
<p>“I have the feeling what is really centrally is the presentation of the results afterwards.” (Analyst 3, Swisscom, date of interview 14/04/2010)</p>	<p>Communication emphasis is core for CI performance (Aktouf 2008)</p>
<p>“This is heavily query-based; one has the impression that the board of directors want answers to them. He wants answers to the most urgent questions and not every time this huge strategy document always providing the same content.” (Analyst 3, Swisscom, date of interview 14/04/2010)</p>	<p>Enthusiastic about the strategy process. The query-based way inspires analyst (Michaeli 2008; Hutzschenreuter and Kleindienst 2006)</p>
<p>“We were pretty much concerned 5 years ago about our strong growth, but the growth was sometimes not very strategy directed. We grew in all parts, the platforms, TV, which was good obviously, but also sometimes ... just grew without anybody analysing the strategic rational behind the growth.” (Analyst 7, Cablecom, date of interview 29/12/2010)</p>	<p>Concerns about former strategic direction of the firm and success (Wright <i>et al.</i> 2009)</p>

Operational emphasis in responses: opinions, attitudes citations of analysts	Commentary
<p><i>“Today the bitter leaf of this crisis has passed, we have improved in many aspects especially for customer service, customer service levels have improved in all areas, in all aspects, the media is becoming more positive, it is not yet positive but it is on the way it is more positive, so we are generally happy and in a good mood about our products for the past three years.”</i> (Analyst 7, Cablecom, date of interview 29/12/2010)</p>	<p>Feeling that customer service has improved, market direction, strategic emphasis (Wright <i>et al.</i> 2009)</p>
<p><i>“Very often on a daily basis through newsletters as distributed emails.”</i> (Analyst 2, Swisscom, date of interview 14/04/2010)</p>	<p><i>Daily</i> indicates an operational time perspective (Businessdictionary 2015)</p>
<p>Asking her how she felt that her team observed competitors: <i>“I think it was not an organisational move. Of course there are – I don’t know how many people are looking after competitor information but I think of course it’s a lot of work, we have a lot of workload here.”</i> (Analyst 4, Sunrise, date of interview 01/10/2010)</p>	<p>Her feelings towards <i>everyday</i> watching competitors (operational) as heavy workload (Fink <i>et al.</i> 2004; Tessun 1997)</p>
<p><i>“Nonetheless we look at it, but it is not treated with the same attention or the same intensity than when Swisscom, or Sunrise, or Cablecom does something”</i> (Analyst 5, Orange, date of interview 20/10/2010)</p>	<p>Emphasis on regularly monitoring competitors (Fink <i>et al.</i> 2004; Tessun 1997), but less emphasis on monitoring the market</p>
<p><i>We have a look at their [main competitor] technological things for example what kind of systems do they have in their network, do they have announced any new contracts with suppliers from the technological side of view, and that’s more or less the most important information, which we include in our study, which we include in our data files, also finances, operational.”</i> (Analyst 4, Sunrise, date of interview 01/10/2010)</p>	<p>Operational perspective on competitor analyses, thus they are intensively monitoring the main competitors (Fink <i>et al.</i> 2004; Tessun 1997)</p>
<p><i>“[Etouch] is a very efficient and good system, you can blog there, even lets say as a business unit within Cablecom you can have your own blogs, you can access through this Etouch to all adviser portal all the news information available, all the people, all the contacts, everything.”</i> (Analyst 6, Cablecom, date of interview 10/11/2010)</p>	<p>Positive attitude towards everyday communication, as it allows to interact (Leavitt <i>et al.</i> 2004)</p>
<p><i>“Within these [regular] meetings, if necessary they [middle and senior management] discuss our performance and the market performance, and based on these meetings we have some decisions, which is not at the end of the day strategic, it is more or less updates ... what we should do in a couple of weeks / months.”</i> (Analyst 6, Cablecom, date of interview 10/11/2010)</p>	<p>His perception of operational management decisions, which were held regularly (Larson 1992)</p>

These perspectives link to level of development of firms – for Sunrise and Orange, the respondents simultaneously dealt with both tasks; developing CI was associated with a heavy workload (Sunrise) demanding both strategic and operational focus from the analyst. For developed firms, it was easy to separate strategic and operational perspectives for Swisscom and Cablecom - for each firm there was at least one strategic analyst. Firms with developed CI processes had the available resources to focus on one of these roles, for example working on new strategic questions (Swisscom). Analysts focussing on strategic issues appeared more enthusiastic about CI.

7.3.4.1 CI Analyst Role varies with different CI Activities

Hutzschenreuter and Kleindienst (2006) claimed that managers could leverage the *strategy process* through *adequate* design such that people are willing to devote energy to it. Respondent attitudes varied on this issue: on the one hand, respondents who operated with a flexible strategic planning process were eager to be part of strategy development (Swisscom). On the other hand, firms with an uneven strategy process appeared less motivated to contribute (Swisscom in its CI beginner stage, Sunrise). The attitudes of the analysts appeared to question how *adequate* the design of the strategy process was (see Table 5.5). Aligning with relevant market disruptions is core when acting on CI. Therefore, flexibility is crucial – an *adequate* strategy process needs ad hoc elements in its design – and the findings from Swisscom support this argument.

Wright *et al.* (2009) described a strategic attitude towards the CI process as follows:
“[An] **integrated** procedure, competitors are identified, monitored, reaction strategies are planned and simulated. Gets **top management support**, co-operation from others seen as essential for future success.”

The description lacks detail in terms of *which data* are gathered, which procedures are *integrated* and how such integration is achieved, as well as with whom analysts should cooperate. The findings of this PhD study show greater insight, extending the understanding of an *integrated CI process* and what influences the *interaction between analysts with management* for decision-making. The dynamic system as suggested in this PhD study emphasises the integration of the CI process into a system perspective, offering insight into how CI activities link to organisational context. Explicit approaches focusing on communication processes and structures for priority setting, and

implicit approaches focusing on learning and flexibility suggest that analysts assess their own approaches in this light. In considering systems engineering, a system integrates elements to produce a result, which is not possible to get from the elements alone (Blanchard 2001) see Section 3.6 on page 51. The systems approach permits a view of CI activities not just as a system for processing information, but as integrative to strategic direction – for instance, using ideas from the St. Gallen model which views strategy, structure, and culture as integrative ‘levels’ (Spickers 2004). Considering CI as a highly interactive process, we can see how achieving integration of CI activities depends on strategic attitude.

From Section 7.3.1, 7.3.2 and now 7.3.3. we can see that organisational characteristics, use of information systems and analyst role may vary, dependent on the specific CI Activity. Each element is now considered in Figure 7.3 in terms of potential integration with how analyst roles are established at firm level. Some of the thinking that past authors have suggested is drawn in to support the idea that analyst role needs to be adaptable for different CI activities.

Figure 7.3: Importance of Clarity in Team Analyst Role

Focus and Planning Patterns		How this links to past research
Organisational characteristics	Function is to define intelligence needs of the company – and specific needs in departments	Links to the work on organisational restrictions in defining CI team organisation (Leavitt <i>et al.</i> 2004; Herring 2006).
Analyst role	Explain which information can be delivered (operational or strategic) Treat CI requests in ad hoc or structured way	Follows on from the focus on operational or strategic orientation (McGonagle and Vella 2012). Also echoes ideas on patterns of systematic or ad hoc analysis (Papadakis, Lioukas and Chambers 1998)
Information System	Manage internal/external information according to needs	Extends the work of McIntosh <i>et al.</i> 2011
Data Gathering and Analysis Patterns		
Organisational characteristics	Management specifies firm toolkit or individual analysis, and analysis time horizon (short-term or long-term).	Clarifies the findings on how attitude of management impacts data gathering (Qiu 2008)
Analyst role	Identify relevant data Identify relevant analysis toolkit or individually choose analysis Identify supporting software.	Reinforces the studies on conducting analysis (Gilad 2004; Fleisher and Bensoussan 2003, 2007)
Information System	Supply internal, relevant market and competitor information. Statistical programs to compute quantitative predictions	Links to the work of McIntosh <i>et al.</i> 2011 on the use of information systems
Decision-Making Patterns		How it links to past research
Organisational characteristics	Setting priorities is either done individually by managers or follows a predefined structure	Extends the considerations of Porter 1980; Herring 2006 by linking analyses to decisions
Analyst role	Evaluate relevant factors for decision	Links to the work of DeVault (2011) by detailing the analyst role
Information System	Combine information, based on identified priorities	Links priorities with analyses and decisions (Huovila 2005).
Communication Patterns		
Organisational characteristics	Structured or ad hoc ways to communicate, explicit ways to share knowledge as reports and meetings	Links KM patterns with organisational structure. Knowledge transfer related to firm culture (Capatina and Bleoju 2012), a trusting culture can enhance knowledge creation (Nonaka and von Krogh 2009).
Analyst role	Manage information transfer to enhance learning within team and with clients	Identifies effective ad hoc communication in CI (De Backer and Gurven 2006).
Information System	Multiple platforms for knowledge transfer between remote teams	Shows relevance of social media, blogs, and intranet (Capatina and Bleoju 2012) for CI
System Thinking Patterns		
Organisational characteristics	Management sees the firm as a whole of integrated parts or as separate functions	Extends management vision of CI (Senge 2006) to CI processes in firms.
Analyst role	Bring together related forms of information. Adaptive strategic thinking	Reinforces relatedness and interdisciplinary problems to be solved (Blanchard 2001)
Information System	Identify system links Systems can supply relevant internal and market and competitor information from firm or headquarter to several audiences	Reinforces system engineering considerations (INCOSE 2013). Are system needs clear? Are system links possible? Is coherence between systems possible?

Organisational characteristics, nature of analyst role and specification of information systems need careful consideration for each CI Management element. Organisational characteristics form each CI activity, which indicates that CI Organisation depends on clear systems integration of CI activities with other firm functions. In the Planning, Data Gathering and Analysis stages, the analyst role is seen as key in conducting CI, but also, the analyst has to be operational in CI activities. The analyst role in departments and firm hierarchy may vary. Information systems are seen as supportive. When looking at the communication and the systems thinking that are required, it is important that information system embed supportive tools in firm processes so that analysts can manage information transfer and bring together related forms of analysis. An awareness of the systems view is key to understanding how the analyst role evolves to become an enabler of alignment between CI processes and CI networking between departments. Consideration of the versatility of the analyst role is important to the potential for achieving synthesis in CI activities, which is considered in the next section.

7.4 Strategic Lens: Link between CI Activities and Decision-Making

7.4.1 CI Analyses and Decision-Making

An effective CI process is considered as one, if it supports decision-making in a way that influences firm performance (Adidam, Banerjee and Shukla 2012). From this perspective, CI analyses offer a basis for analyst recommendations in terms of decision-making. Michaeli's (2008) recommendations for analyse, prioritise and escalate are evaluated for the Swiss telecom firms and presented in Table 7.4.

Table 7.4: Integration between Analysis and Decision-Making across firms

	Swisscom 2010	Sunrise 2010	Orange 2010	Cablecom 2010
Approach to Analysis	Ad hoc	Ad hoc	Process	Process
Static, Dynamic and Priority Setting Analyses	Static, dynamic, and priority setting analyses	Static, basic dynamic analyses and set priorities	Companywide approach to static analyses, basic dynamic analyses, priority setting process	Companywide approach to static analyses, some indications of dynamic analyses, priority setting process
Market Focus	New technologies	New technologies	Awareness of new competitors such as MVNOs	General market screening, awareness of new competitors (MVNOs)
Firm Level (see Sections 5.6.1 and 5.6.2)	Analyses are adapted to queries, analysts chose from a variety of tools allowing to have a differentiated view of the own market	Some analyses are identified, potential to apply more appropriate tools to identify market developments	Analyses from framework with levers, danger of a narrow view on the own market	Companywide approach to static analyses, analyses are tailored to the Swiss telecom market
Strategy process	Flexible / query based	Process with ad hoc elements	Process, focus on specific topics as mergers	Process with structured meetings, strategic function
Mutual support of CI team and Management	Management supports CI – CI impacts strategy	Management supports CI – CI has limited impact	No management support of CI –limited impact of CI, analyses from headquarter	Management supports CI – CI impacts strategy, adapt corporate directions to local market
Market Reaction	Prepared to enter core market of competitor	Does not know	Prepared to offer similar product	Prepared to make a counter offer
Firm Level (see Sections 5.6.3, 5.6.4 and 5.6.5)	Flexible process, established link of CI with management, prepared to react on market changes	Sticky process, analyses in development, decision support is less effective, link CI with management not established	Process partially established, weak link of CI with management, prepared to react on some market changes	Strategy process with a strategic function and structured meetings, established link of CI with management, prepared to react on some market changes
Market Level (see Section 6.6 and Appendix VI.C)	Flexibility in conducting the strategy process allows the firms to react on market changes. New technologies and offers from MVNOs and Over the Top providers (OTT) show that quick reaction is a core advantage. Only Swisscom shows a strong emphasis on conducting dynamic analyses with the aim to predict and adapt to market changes at an early stage.			

The assessment in Table 7.5 above is based on self-assessment form respondents, on interview data and on company documents made available. We have seen that CI analyses were structured into static, predictive, comparative, and priority setting approaches in Section 3.5.2 and evidence of analyses across each firm is identified on left hand side. Finally, escalation is an activity where specific CI issues are integrated into CI outputs that feed into management thinking – this is examined in terms of how CI feeds into the strategy process, how management encourages CI input and how CI outputs actively support management actions. In placing the nature of analysis approaches on the left hand side, and the link to decision-making (escalation) on the right, we see variation in degree of analysis sophistication, and level of fit between the CI process and management, as perceived by analysts. For an overview of effectiveness and sophistication see Appendix VIII Figure VIII.1.

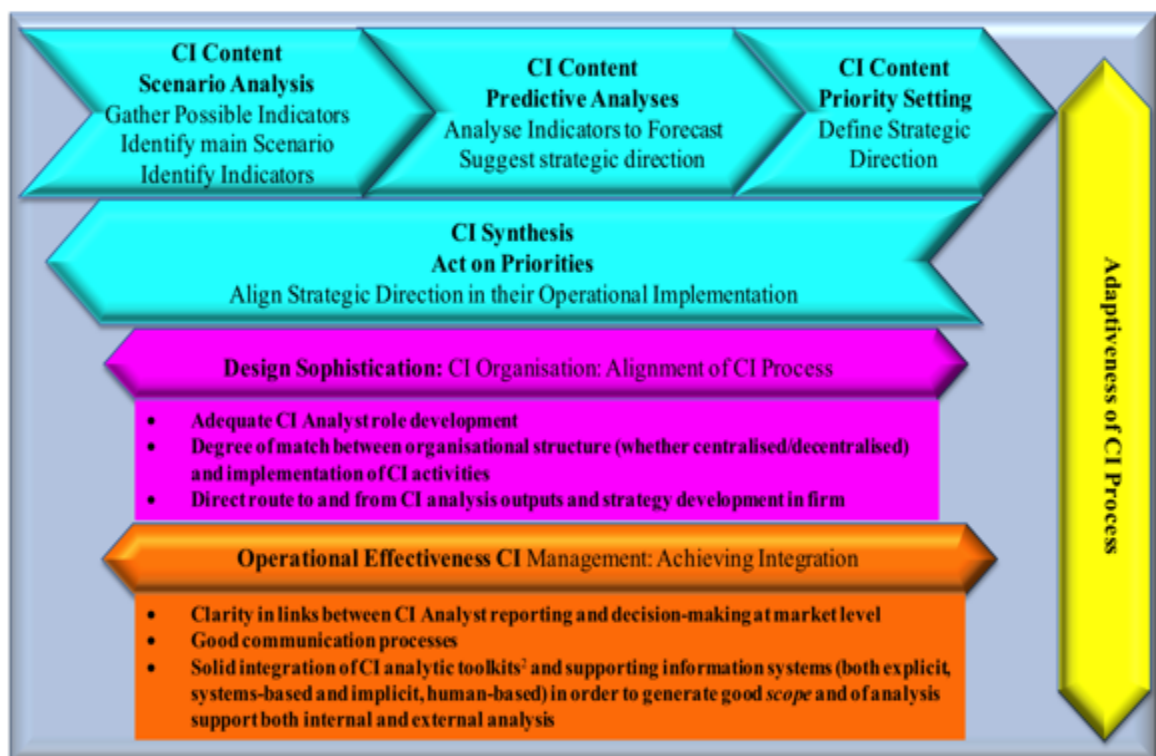
7.4.2 CI Analysis and Adaptiveness to Changes: Need for Dynamic Content

When considering adaptiveness to changes, it is sometimes difficult to capture what this means for rapidly evolving markets. Rouibah and Ould-ali (2002) pointed to the crucial importance of interpreting signals, suggesting the need to recognise weak signals and to ‘*transform seemingly unrelated information elements into useful puzzles, [CI output] using links in order to produce hypotheses about potential opportunities and threats*’. This PhD study has offered a good application of this idea in Section 6.4, by identifying and analysing signals that permit a ‘hypothesis’ as to future market direction and then using those signals to set up an optimal scenario that is applied to one firm.

Taking this forward for other firms, the focus on scenario analysis can be helpful. Michaeli (2006) identified scenario planning as an analysis tool which can be considered as sophisticated and resource intensive. van der Merwe (2008) identified that systems thinking is crucial for the scenario planning process and he noted that scenario planning is linked with continuous learning for strategy. For analysts, *scenario analysis, even with few resources, includes foresight and supports predictive decision-making, by offering views on possible future market developments* (O'Brien *et al.* 2007).

Figure 7.4 describes the critical elements of CI Content that link to a dynamic framework of CI Analysis. Possible scenarios are mapped and evaluated through the use of market indicators. Those indicators which appear to describe well the competitive situation enable a main scenario to emerge, which is then applied for predictive analysis and the potential strategic development of the firm for this scenario be predicted. In the priority-setting phase, (moving horizontally), management defines the overall strategic direction, taking account of the other CI Activities – it might be sophistication of information systems available; it might centre on whether a centralised or decentralised style is in use and how communication occurs. As would logically be expected, practical decision-making (actual company response) occurs through CI Synthesis.

Figure 7.4: Framework of Adaptiveness in CI Processes



Achieving adaptiveness in the CI processes depends on

- the dynamic evolution in CI Content (evident in horizontal aspects of the diagram above) – which deals with adaptiveness in *scope* of analysis

¹ That include good scope and nature of analysis, as shown in Figure 7.4 above

- b) synthesis achieved in vertical part of diagram, which addresses adaptiveness in both the *focus* and *forms* of analysis² though bringing together
- CI Design Sophistication³ (involving adequate CI analyst role development, degree of match between organisational structure (whether centralised/decentralised) and implementation of CI activities and strong direct routes to from CI analysis outputs and strategy development in firm.
 - Operational Effectiveness⁴ (achieved through clarity in links between CI analyst reporting and decision-making at market level; through good communication processes and a solid integration of CI analytic toolkits⁵ and supporting information systems (both explicit, systems-based and implicit, human-based) in order to generate good scope of analysis, (explicit and implicit) to support both internal and external analysis

The early elements of this CI Adaptiveness in CI process framework (noted in blue) are aligned with the later elements (noted in red) through Design Sophistication and Operational Effectiveness.

The illustration of Adaptiveness in CI processes is in line with the frameworks of Herring (1999; 2006), who demonstrated how to identify ‘key intelligence topics’ (see Section 3.2.1 on page 27). It also echoes the work of Dishman and Calof (2008) by concentrating on operational and strategic elements of the CI process. By setting a dynamic scenario analysis of the actual market as an initial step, it takes the work of Gilad (2004) further, by demonstrating how to identify potential strategic directions at an early stage.

7.5 Summary of Chapter

This chapter has drawn out some of the critical variations in CI Activities of Swiss telecom firms that have emerged in this study. Section 7.2.1 has identified the variation in scope of CI Activities at different stages of CI development (developing, developed), has been paralleled by the divergent organisational patterns that have emerged from the

² See Figure 6.2 CI Analysis Methodologies

³ Related to CI Management

⁴ Related to CI Organisation

⁵ That include good scope and nature of analysis, as shown in Figure 7.4 above

case studies, noting the variation between centralised and decentralised patterns, greater or lesser use of implicit and explicit approaches to CI. In considering effectiveness and sophistication of processes in Section 7.2.2, this chapter has highlighted the importance of soft elements to successful CI Management (involvement, feedback, communication structure, networking). Evidence from this study suggests a) that networked communication in both developing and developed CI processes is effective. Variation in emphasis on feedback and on interactive networks seems to link to level of sophistication of CI processes.

What emerges from Section 7.3 is that CI is a process that needs flexibility in planning and in implementation to adapt to the variations in organisational context. Patterns in the findings have shown how query based, flexible analysis approaches in firm-centred settings differ from more structured analysis techniques in headquarters-based firms and Figure 7.2 offers a useful framework that maps the relationship between organisational patterns and CI processes.

The focus on the analyst role in Section 7.3.4.1 and on the degree to which the analyst is involved and contributes to decision-making in Section 7.4.1 emerged as critical elements in this research. These findings on analyst role and contribution through adaptiveness on changes are relevant for many other service firms.

Section 7.4 has discussed the challenge that all firms have in ensuring that CI Activities (CI Content in particular) generate direct support for and have influence on firm decisions.

Chapter 8: Conclusion and Contribution of Study

8.1 Introduction

This chapter concludes the research by giving an overview of how the research objectives were met in **Section 8.2**. Thereafter, **Section 8.3** shows the contribution to knowledge of this PhD study and identifies how this research has extended past research. In **Section 8.4** some managerial considerations to arise from the study are set out. **Section 8.5** acknowledges some limitations of the study while **Section 8.6** notes areas for future research, followed by concluding comments in **Section 8.7**.

8.2 How the Research Objectives were met

The research objectives were based on examining CI processes in the four Swiss telecom firms using three different but complementary lenses. The first lens examines the nature of the CI process using the Integrative CI activities framework as the basis of analysis. The second lens involved examining elements of structure that underpinned CI activities in firms – this included both an examination of the CI analyst role and how the role fitted into the organisation structure. Finally, the third lens of analysis investigated the link between CI analysis and management decision-making. In examining the nature of the CI process in firms, the following objective was addressed:

1. To identify the nature and scope of CI activities (operational elements) in the four case firms

By identifying CI operation from a modular perspective (Dishman and Calof 2008; Krizan 1999; Jaworski and Wee 1992); where key CI tasks are identified in a processual way, past studies have offered a useful approach to understanding CI from an academic perspective. However, the focus in past research has primarily been on optimising CI process steps and on operational effectiveness (Prescott 2003; Fuld 1995). In this PhD research, the researcher has extended past research by bringing together the modular and systems perspectives on CI into a more comprehensive framework (Integrative

Framework of CI Activities – see Section 3.9.1), than in previous studies. This framework addresses the knowledge gap identified by Trumbach and Elofson (2007) - how to bring together and align organisational structures/thinking with a turbulent environment.

The CI process was identified by analysing interviews and checklist answers from CI analysts of the four large-scale telecom firms. Findings were gathered using the CI Activities framework – (see Section 3.9.1) – this is the first study to examine CI process, organisational support and system integration together, not just for evidence of CI implementation but for the link between CI activities and their contextual value. From open coding of the interview transcripts, the researcher was able to identify distinctive patterns in the CI activities within the CI activities framework across firms (see Section 5.3 for detailed findings). It became apparent that analysts working with newly established and developing CI processes reported more basic approaches. Selective coding that identified the relationships between the CI activities also enabled an examination of distinct CI activities at both basic and advanced levels. From that analysis, it was concluded that Content and Synthesis were the most significant CI activities in terms of how the CI analysis across firms linked to management decision-making.

The second lens involved examining elements of structure that underpinned CI activities in firms. The following objective was addressed:

2. To examine how organisational structures shape the CI processes in the four case firms

Variation at organisational level in the four firms was examined in terms of degree of decentralisation and centralisation in CI team organisation, and whether a headquarters or firm level approach was taken in choice of analytical approaches. Using both open coding and axial coding of the data from the interviews, some interesting patterns emerged relating to the adoption of explicit and implicit (ad hoc) approaches to CI analysis. It was surprising that firm-centred organisations reported more ad hoc

approaches even for developed CI processes. In contrast, in headquarter-centred organisations, analysts reported that their approaches included predefined processes for their priority setting activities, and internally structured processes of communication. The identification of explicit and implicit approaches to CI analyses enabled the researcher to look in greater detail at this second lens as how ‘organisational patterns’ shape both work of CI analysts and the forms of analyses undertaken. For instance, the study identified how patterns of analysis performance varied according to whether a HQ-based approach or a firm-based approach to CI Activities was adopted. This PhD study identified how information needs varied according to the firm organisation, thus leading to differentiated and firm-specific approaches to CI analyses being undertaken.

In addition, this study focused on variation in team organisation of CI analysts. From the earliest interviews with CI analysts, two distinct roles were found, which can be described as operational and strategic. Insight from this research has noted how, within developing CI processes, the analysts appeared to act at both strategic and operational levels simultaneously. Analysts working in firms with developed CI processes specialised either in operational or strategic roles. Analysts working in firms with developing CI processes appeared to be less effective at first sight, but this might be due to the heavy workload – CI analysts in small teams simultaneously dealt with operational and strategic CI issues. While CI strategic analysts claimed that they influenced strategy through their involvement in strategy planning, this was found in practice to be difficult to assess. Tables 7.3 summarises such patterns well.

The third lens of analysis undertaken in this study was to investigate the link between CI analysis and management decision-making. Two sub-objectives were addressed:

3A. To evaluate analysis approaches in the four case firms

Variation in effectiveness was illustrated in the findings through difference in the kinds of analyses used and in the communication processes adopted for CI. Through analyses of interviews and checklists, the perceptions of the analysts of the effectiveness of the CI processes were established. These findings advanced previous studies, first by

providing evidence of a strategic perspective on the part of analysts, and second by showing the variation in their evaluation of CI process characteristics. Based on the categorisation of CI analyses proposed in Section 3.3, the researcher was able to identify, in the findings, how the analysis approaches varied with firm organisation, such that analysts in headquarter-centred firms applied standard toolboxes in most situations, whereas analysts in firm-centred approaches selected analysis methodologies based on their experience, emphasising more implicit forms of analysis and a greater flexibility in the use of analytical tools. The toolboxes adopted in headquarters-centred firms were standard, such as the Five Forces Framework. The implicit approaches in firm-centred companies also included relatively limited forms of analysis, but showed some variation between static analyses and dynamic forms, notably, a scenario analysis (see Figure 6.2). Organisational characteristics show variation in analysis methodologies dependent on size of the analyst team and their experience of the range of CI analyses. Both indicators were linked to perceived effectiveness of CI analyses, as shown in Section 5.6.3 and Appendix VII.

3B. To identify how analyses potentially support management decision making

In addressing Objective 3B, it was found that a range of analysis methodologies existed in the four firms, but few dynamic analyses were adopted. Therefore, the potential for the application of a more dynamic predictive form of CI analysis was then investigated. For the scenario analysis, a prior study which examined the Dutch telecom market (De Man *et al.* 2009) was used as a template to develop a dynamic predictive analysis of the Swiss telecom sector. Analysing indicators for predictive purposes provided a useful external view on the Swiss telecom sector. The indicators were annual data, which were gathered from Creditreform, the Swiss Patent Office, the Swiss federal statistical office, and profit data of Swisscom from their reports and from the Swiss Postal office. By comparing the indicators of the Swiss telecom market with the scenarios identified as relevant for the Swiss telecom sector, the main scenario and the relevant indicators were identified. The identified indicators were then used to provide a predictive analysis (see Section 6.5.4). This analysis by the researcher offered a useful contribution by

illustrating how predictive CI analyses can be applied for management decisions in this sector.

8.3 Contribution to Knowledge

This PhD study investigated the CI process from three different perspectives, as noted above in Section 8.2. Three key theoretical contributions emerged from this study:

- Structuring the CI process into an Integrative CI Activities Framework
- Mapping Organisational patterns that shape CI Activities
- Identifying the importance of Dynamic CI Analysis for Decision Making

Each of these contributions are now considered in turn.

8.3.1 Structuring the CI Process into an Integrative Framework of CI Activities

By structuring the CI process into an Integrative CI Activities framework, this study extended the work of Dishman and Calof (2008) on CI processes. The findings from Dishman and Calof (2008) were based on dichotomous variables from questionnaire data (yes/no answer options) about a range of CI tasks (CI Modules). This study extended their research by conducting comparative analyses of the experience of CI analysts and defining more clearly the nature of the CI process as it is implemented in firms, using a case study method.

A strong contribution to knowledge has emerged in the integration of the modular view (Prescott 2003; Dishman and Calof 2008) and the systems view (Bartes 2010; Senge 2006) which offers a more in-depth understanding of the CI process. Brewster (2011) showed how the system perspective can help in learning to develop complex interlinked purposes. This study has developed the work of Brewster (2011) by identifying elements of systems that relate to the CI process. By examining organisational elements that affect CI process activities, it was found that organisational characteristics – seemingly independent of CI on first sight – had a clear impact on forms of CI analysis. (see Figures 5.1 and 7.2).

Jaworski and Wee (1992) in their analysis of CI activities, anticipated that CI activity would strengthen the communication between departments. This study has taken their

work further by making a distinction between networked and ad hoc communication, and found that CI analysts are involved in both levels of communication, and that the relationship between CI and other functions / activities varies in intensity according to the organisational characteristics in the firms.

Peyrot *et al.* (2002) found that intensity of CI use increased with degree of market change, based on interviews with CEOs of small firms. This study has developed their work by conducting interviews with CI analysts of large-scale firms to gain first hand insight into the planning of CI activities and how that relates to both the analyst role and to CI support structures in firms. The findings have shown intensive use of CI in the four case firms – with augmented elements of communication and market observation of new entrants in 2015 (see follow up interview, Appendix VI).

Overall, the Integrative CI Activities framework (Figure 3.4) adopted here has enabled a better breakdown of the key CI elements in order to ascertain levels of CI activity for less developed and more developed firms.

8.3.2 Mapping how Organisational Patterns shape CI Activities

Through the adoption of an organisational lens, a map of organisational variation was developed from the examination of how organisational structure/attributes support the CI activities of firms (see Figure 7.2). Rothberg and Erickson (2013) stated that to date organisational characteristics of CI were treated sparsely, noting a need for more research. This study has addressed this gap to some degree, through noting a distinction between centralised and decentralised; between firm-based and headquarters-based support and drawing out some implications arising from those variations. Alsina *et al.* (2016) emphasised that analysts' roles are central for networking and communication – The findings here showed that learning approach and communication are very important in explaining the variation in CI processes in the firms. In addition, this study offered a clearer breakdown of the analyst role, with consideration of the strategic and operational orientation in the roles. (see Sections 5.3.2 and 5.5.1).

Dishman and Calof (2008) identified the impact of 'organisational awareness and

culture' on the process. Lim (2013) identified that the capacity to provide accurate analyses with predictive purpose is related to organisational patterns and saw the need to identify the influence of organisational characteristics further. This study extended the research of both Lim (2013) and of Dishman and Calof (2008) by identifying firm characteristics that shape the CI activity in the Swiss telecom firms. From the findings the following variation in organisational patterns were identified:

- A distinct variation in approach between *developing* and *developed* CI processes.

Section 5.5 has found variation of approaches in firms wishing to develop a CI process versus firms with established CI processes. This PhD study extends the study of Wright *et al.* (2009), who identified the variation of CI approaches by their attitudes. In the work of Wright *et al.* (2009) the potential link between attitude and firm organisation was not fully investigated. This PhD research offers an alternative explanation, namely that the strategic orientation intensifies as the CI processes of firms become more developed. The findings showed that analysts working with developed CI processes (Swisscom, Cablecom) reported a stronger strategic orientation, working regularly with management, while firms with developing CI processes (Sunrise, Orange) reported less strategic orientation, where managers of departments appeared to see their team only as sources of CI information. As a result of their emphasis on establishing CI at an operational level in their department or firm, and engaging in a less networked process of collaborative CI, the involvement of CI analysts in suggesting strategic options to management was not as strong as in firms with more established CI processes (see Figure 7.2).

- Firm-centred and headquarter-centred structures to support CI became evident as the data from each firm was analysed. This translated into a distinction between centralised and decentralised CI team organisation, as outlined in Section 5.5.1.

Britton *et al.* (1997) investigated approaches for developing and developed CI systems, regarding *decentralised* approaches as beneficial for software and multimedia system development. The findings of this research extend their work by differentiating between *centralised* support structures for CI in firms *developing* their CI process, and allocated *decentralised* activities in main departments with *developed* CI processes. Dong *et al.*

(2012) emphasised that knowledge sharing depends on the people and that a facilitative organisational design is needed to effectively share CI knowledge. Specifically, they found that knowledge shared within a network – through social ties – is more efficient than knowledge that is spread throughout the firm. Findings in this research reinforce Dong *et al.*'s (2012) findings that decentralised approaches linked to CI development. In this study, the structures supporting CI activities evolved with experience.

Wright *et al.* (2009) identified that an *ad hoc* CI organisation is in its beginner stage of CI development. Michaeli (2008) found that 'beginners of CI' are the lonely stars or guerrillas, whereas more advanced CI professionals place CI units in some parts of the organisation and advanced CI professionals have companywide CI centres. This research has identified an alternative beginner stage of CI, which was common for the large-scale Swiss telecom firms. At their beginner stage, a CI team was organised centrally to build the CI process. The developed stage of the CI process showed decentralised team organisation and, depending on the firm organisation, both *ad hoc* or structured approaches. *Ad hoc* approaches were not solely evident in beginner stage of the CI process; this study identified that *ad hoc* approaches to CI occurred within a firm-centred approaches, but was also present in a headquarters-centred approach when flexible intelligence actions were required. Figure 7.2 summarises the organisational patterns by mapping how they shape CI Processes.

- The existence of explicit and implicit patterns in CI planning activities.

Previous work of Hernández Sánchez *et al.* (2013) identified patterns of explicit and implicit knowledge, with both being core for knowledge creation. In this PhD research, findings have drawn a link between implicit/explicit approaches and level of CI development; highlighting how, in large scale firms, *implicit* approaches to CI planning were more evident in developed CI processes (see Section 5.5.4)⁶. In contrast, in firms with developing CI processes, interview data suggests that in those firms, more *explicit* approaches to CI planning were frequently noted (using information systems, working

⁶ The findings showed that Swisscom emphasised *ad hoc* ways to communicate, and reported flexible analyses and strategy processes.

on predefined process for communication and strategy). These findings address, to some degree, the need, noted by Hernández Sánchez *et al.* (2013), to investigate how implicit and explicit approaches vary according to organisational types. The findings of this study address this gap, by investigating how organisational characteristics seem to relate to the choice and use of implicit or explicit analyses. Staskeviciute and Neverauskas (2008), found that informal organisations positively affect organisational learning, with patterns of coordination associated with more ad hoc approaches. This PhD study takes further their work by specifically looking at the influence of organisational variation – with informal CI structures appearing to encourage organisational learning in firm-centred companies.

8.3.3 Identifying the Importance of Dynamic CI Analysis for Decision-Making within the Swiss Telecom Sector

8.3.3.1 Evaluating Analysis Approaches in the Case Firms

Previous research has addressed specific elements, notably a) in distinguishing elements of basic vs advanced CI analysis (Evans 2012); and b) in noting success criteria for CI and information systems (McIntosh *et al.* 2011); however, variation that relates to the effectiveness of CI processes has not been studied in detail. In considering aspects of CI analysis that were effective in the case firms the findings have shown that this depends on many elements; the design of the CI process; the way analysts selected and applied their analysis tools and their CI outputs contributed to decision making. This takes further the work of Bartes (2010), who examined elements of effectiveness in doing CI analyses focusing on predictions. In this PhD more details have emerged on the importance of the integrating mechanisms between CI analysis processes (e.g. priority setting) and decision making at firm level. The categorisation of elements (e.g. forms of communication; degree of priority-setting) that can lead toward degrees of effectiveness and sophistication is drawn both from analyst perceptions of how their CI practices (e.g. usage patterns of analytic tools) link to decision-making and to researcher assessment (both are set out in Section 5.4, and Table 5.5). These identified patterns are useful in other sector studies where researchers might examine the effect of CI on firm strategy.

From this research of the Swiss telecom firms, considerations of how analytic approaches in the firms may align with market conditions has been furthered through the development of a series of useful frameworks (Figure 6.2 CI Analysis Methodologies, Figure 7.4 Adaptive CI Analysis). Sawka and Hohhof (2008) saw the effectiveness of the CI modules (the module view) as interrelated and this PhD study takes this aspect further, focusing on key links between the lenses of analysis (operational, organisational and strategic) by taking a systems perspective and by showing how the KM Process can support the embeddedness of CI (see Figure 3.4). Davenport (1998) identified knowledge sharing as an element of KM. These elements of KM were confirmed for the CI process in the case firms.

The findings in variation for CI effectiveness, shown in Section 5.4, has offered a more detailed breakdown of the components of CI effectiveness. Trim and Lee (2007) argued that CI frameworks should be culturally and industry specific, suggesting a framework to formalise intelligence activities. However, in their work, they did not detail their approach for a specific industry. This study has taken this further by developing a sector-specific examination of the factors that appear to inform of CI effectiveness across firms. Trumbach and Elofson (2007) identified the importance of aligning ‘organisational flexibility’ with ‘environmental turbulence’ as a key criterion for effective scanning of the environment. While confirming their findings on the importance of organisational flexibility, as outlined in Section 5.5, this study has extended the work of Trumbach and Elofson (2007) by drawing out the importance of communication and of networking to a better CI Synthesis. Key learning points in achieving effectiveness of CI Process and sophistication in CI Design and how this contributed to decision making have been highlighted in Section 7.2.2, offering more concise thinking on effectiveness.

8.3.3.2 Competitive Context Analyses supporting Management Decision-Making

This study took past research further with an outline of the challenges that each firm encountered when seeking to adapt their data transformation processes to ensure adequate support for strategic decision-making (strategic lens). Previous work by Fleisher and Bensoussan (2003; 2007) and BABOK (2009) provided some insights into

analyses relevant for CI. However, while a wide range of suggested analyses has emerged from such past studies, there has been less research into the levels of analysis and the selection of CI analysis methodologies – the choice of the appropriate analysis tool within firms. The research has extended previous work by identifying the main purpose of potential CI analyses and outlining different scope and levels of analyses. This framework distinguishes between dynamic and static forms of analysis and an internal or external orientation, as noted in Figure 6.2.

This framework proved useful in identifying analysis challenges. Findings from interviews suggest that the CI analysts tend to use a limited range of analysis and that such tools tend towards the static *form* in the diagram, being primarily concerned with past or present time horizons. Limitations in form and scope of analysis methodologies and system and resource inadequacy were acknowledged when faced with the need for CI to deal with major strategic projects, where the information needs and time required to support strategic response was enormous. In firm-centred approaches (Swisscom, Sunrise) analysts adopted more varied approaches to communication of CI outputs to management, but struggled to act in a comprehensive way for important CI projects. Insight from CI analyst experience in headquarters-centred companies (Cablecom, Orange) noted more systematic internal processes when reporting CI outputs; but great difficulty in adapting standard tools. Thus, Figure 6.2 was helpful in clarifying the need for more market-led analyses and for more combined static-dynamic analyses (see Sections 5.5.3 and 6.6).

In focusing on more dynamic forms of CI analysis, this study concentrated on scenario analysis as a first step to more dynamic forecast analyses, showing a method to identify indicators, to analyse them for predictive purposes specifically for a market (Swiss telecom market) characterised by rapid changes, as noted by BAKOM (2005). The identification of an appropriate scenario (outlined in Section 6.4.3, on page 185) offered a good link to strategic decision-making. The scenario ‘technology driven world’ indicated, in this case, that the number of new entrants from other industries into the telecom market was likely to increase, thus offering a logical set of options for firms in the sector in terms of investment in their research and development of new products.

Different scenarios can emerge that offer different decision-making options for firms in other sectors. This PhD study takes further and extends the work of De Man *et al.* (2009) in the Dutch market; it confirms some competitive options that were identified in independent studies that paralleled this study and it took further the work on ‘indirect competitors’ of Hernandez, Sanders and Tuschke (2015). By detailing how to conduct a scenario analysis and illustrating the relevance for strategic decisions, this study has shown how to consider distinct CI analytic tools in a sector level study. Furthermore, in identifying the range of analytic tools that are required to address the rapid changes in the Swiss telecom sector, the work of Trumbach and Elofson (2007) has been extended through a more practical consideration of how analytic approaches may align with market conditions (e.g. risk analyses to match level of turbulence inherent in rapid technological change).

8.4 Managerial Implications

In considering managerial implications, we first briefly consider the current competitive landscape of the Swiss Telecom market. Through considering organisational implications and the role of the analysts we consecutively examine how Swiss telecom firms might adapt their CI activities in this landscape.

8.4.1 Brief Overview of Organisational and Competitive Change in Market

BAKOM (2011) suggested that the Swiss telecom market had, over the previous five years, experienced highly evolutionary technological changes, but existing competitors had the benefit of high entry barriers, due to the bidding process for frequency licenses, the need for fibre optic infrastructure and price restrictions from competition. Despite the cushion of such barriers, the impact of organisational change is significant. Cablecom’s strategic analyst explained that changes in their forms of communication have been the result of the takeover by UPC-Cablecom of the former firm Balcab in 2006 (Moneyhouse 2006). This change, for Cablecom, was not smooth and had impact on the effectiveness of all key functions, not just CI activities.

The telecom market is constantly evolving- in examining market structure in 2015, as in many other European countries, mergers and takeovers have shaped the recent structure of the Swiss telecom market. At a directly competitive service level, BAKOM (2011) identified that the telecom market is characterised by customer demand for fast Internet and digital capabilities in HD quality and huge competition in product bundle offers. Both patterns have intensified- customers are more savvy, more demanding and willing to switch service providers. Competition is even fiercer as the market attracts potential new competition from other industries. As an illustration, Table 8.1 compares prices of bundles across Swiss TV providers and this gives an idea of the positioning of services in the market.

Table 8.1: Overview of Bundle Offers Swiss Telecoms (monthly fees in CHF)

	TV, Phone, Internet XL	TV, Phone, Internet L	TV, Phone, Internet M	TV, Phone, Internet S	TV, Phone, Internet XS	TV, Phone, Internet light
Swisscom	169	139	129	109	89	69
Sunrise	95	95	70	60 ¹		
Salt.²	135	105	85	65	50	
Cablecom³	129	99	79	59		
Green⁴	75	69	59			

Source: Swisscom bundle 2015; Sunrise bundle 2015; Salt bundle 2015; Cablecom bundle 2015
The offer does not include fixed line network

² Salt offers just Mobile phone and Internet connection. More options are available as Zattoo TV streaming, and free devices (smartphone, tablet and speaker)

³ The offers include free telephony to fixed and for a limited time mobile networks.

⁴ Green, an MNO offers no fixed line network phone connection and less TV channels

In comparing firms at product level, we can see the competitive position in the price of service bundling for household telecom services. Swisscom offers high priced bundles with better technical performance, while both Sunrise and Salt offer rather inexpensive bundles. Salt explicitly targets young people (Salt Young 2015; Salt Cinema 2015), and Sunrise engages in new device partnerships- new apple devices are incorporated regularly into Sunrise offers (Apple 2015). Nonetheless, both firms offer a more limited range of services.

Given the above illustrations of rapid change at organisational level and of intense competitive forces at product level, we might ask how Swiss telecom firms might adapt their CI activities in this competitive landscape. Three areas are briefly considered:

- a) the need for CI Analyst role development
- b) the importance of communication and feedback to CI process development
- c) the need for dynamic analysis to generate strategically relevant responses

8.4.2 Need for CI Analyst Role Development

In prior studies, notably Johnson and Lederer (2005), the analyst focus has been relatively narrow. Past research has looked at department managers and CI analysts (Gibbons and Prescott 1997), but there has been less focus on identifying the variation in CI analyst role. This PhD study found that the work of the CI analyst is at the core of the CI process – they are responsible for data identification and analysis, for communication of relevant CI analyses to management in forms that facilitate decision-making and for communication with other departments to explain and clarify the CI outputs. In Table 5.12, we can see how the analysts in the case firms defined their role. Specifically, feedback about their outputs enabled them to learn and develop their approaches. Swisscom’s strategic analyst identified how central the role of the CI analyst is in the CI process, seeing the analyst as a ‘focal point’. In contrast, the strategic analyst at Cablecom defined the CI analysis role in terms of information management, noting the gathering, the reporting and comparison of data as important tasks. However, the Swisscom analyst explained the importance of a more peripheral view in the telecoms sector, and this is in line with Neugarten’s (2006) emphasis in the need for early learning about market changes. Rouibah and Ould-ali (2002) further note how the competitive intelligence process is often heuristic, noting how organisations “*interpret weak signals and Business Intelligence as **complex** processes in which individuals follow a **heuristic cognitive** process*”. Findings in this research have shown how CI analysts undertake problem solving and experience continuous learning episodes throughout their work with CI.

Taking this idea further, a key requirement of the CI analyst role is the integration of competitive intelligence with customer information. Orange’s strategic analyst

explained that analysts need to communicate with specialists and different management levels in the departments, noting the importance of liaison with product managers and those with specific geographic market responsibility. Cablecom's analyst explained how operational plans relate to both customers and competitors, showing how CI issues are interlinked. What the findings indicate in relation to the CI analyst role is that it can be both functional (information gathering and analysis); strategically aligned (link to strategy development) and integrative (bringing together relevant knowledge to bear on decision-making). The CI Analyst role is interlinked with other product and market analysis activities and is aligned with operational and strategic tasks. As the CI analyst can be placed at the centre of some of this alignment, it is possible to take a systems perspective (Blanchard 2001) on competitive intelligence as a function, by emphasising the interplay of the parts (Senge 2006). CI analysts scan the market by taking a 'peripheral' perspective for indicators impacting firm performance. They communicate with varied departments, different management levels, and a range of specialists about indicators, trends, data and generate some resulting analyses. Yet, some of the 'heuristic' aspects of the CI process, noted by Rouiba and Old-Ali (2002), emphasize the interlinking role that is part of the CI process. This makes the communication aspect of CI implementation quite significant.

8.4.3 Focus on Communication and Feedback in CI Process Development

Adaptation to market conditions is important for CI to effectively deal with market changes, because technology and organisational changes characterise the fast paced, saturated and competitive telecom sector (BAKOM 2005; Brändle *et al.* 2012; Vernon and Wells 1966). In the findings in this study, CI analysts noted that working in a firm environment that supported role learning was an advantage in identifying and adapting CI activities. Specific elements are noted in Table 5.12. Explicit knowledge sharing and dissemination through regular strategic meetings was noted by both Cablecom analysts. Formalised meetings with prioritisation reflected a focus on alignment of CI activities to track changes in the market. A focus on clear reporting and prioritisation helped identify *strategic direction*, which was communicated formally. In middle management meetings, operational tasks were *aligned* with the identified direction (see quote in

Table 5.12). Kouji *et al.* (2010) identified how explicit knowledge sharing practices can facilitate learning.

The implication of these patterns for CI analysts in other sectors is that explicit and implicit communication approaches fulfil different goals. This PhD study found that varied communication approaches (ad hoc consultation and explicit reporting), clear feedback, planned meetings and a focus on learning and analyst development can be indications of trust in the implementation of CI activities throughout the firms. The findings confirm that human factors are as important as systematic processes in CI role implementation (Salmeron and Herrero 2005).

In considering the need for more adaptive CI processes in the Swiss telecom sector, the need for development of the CI analyst role is central. This PhD study has emphasised that analysts shape the CI process and its effectiveness. Developing the CI process starts with the learning process of CI analysts. Thus, careful consideration of communication processes, forms of liaison and feedback opportunities that may support the CI Analyst is critical to effective CI analyst role implementation.

8.4.4 Need for more Dynamic Analysis to generate strategically-relevant Information

The scenario analysis in Chapter 6 identified that adaptation to and anticipation of changes in technology appear to be important strategic responses, if Swiss telecom firms need to align their strategy towards the identified Scenario 1) ‘technology driven world’. Where potential new entrants from other industries are a key threat, there is likely to be a redefinition of existing industry boundaries (see Section 6.4.1 on page 180). Organisational and technological shifts are rapid in this industry – therefore CI processes need to be adaptive, CI analytic tools need to be more dynamic in scope, with less static and more predictive capacities, and communication needs to be internally multi-layered and externally highly networked to include potential new technology partners (see Section 7.4.2 on need for adaptiveness in CI Analysis).

The adoption of more dynamic CI analysis is key to getting the necessary information to allow firms to align better with market developments. The first step in considering how CI Content might incorporate CI analysis that can enable firms to respond more effectively in decision-making, is to ensure that CI analysts tools are more dynamic in scope, with less static and more predictive capacities, in order to identify competitive developments that potentially threaten firm's performance at an early stage (e.g. new technologies impacting nature of product offers; new competitors; planned mergers; changes in legislation).

Figure 7.4 offers some useful guidance by identifying the value of more dynamic CI analyses and this can be relevant to CI processes in other firms in three ways:

- By structuring CI analyses for past and present time horizons as a basis for predictive analyses of competitive and market developments. The CI analyst gets a full picture of the market when conducting analyses with varying time horizons.
- By offering a clear target for CI analysts when considering how they support management – the key CI decision support areas are identifying alternatives from analyses, setting priorities, and escalating decisions.
- By generating system design choices, such as developing ad hoc competencies and appropriate organisational structures that map with a) the stage of development of firms and b) the degree to centralised and decentralised processes that occur.

8.5 Limitations of Study

This study was conducted in 2010. In a fast moving market such as the telecom market, one issue that could be regarded as a limitation is that the research data is now five years old. This limitation can, however be set aside if we recognise that the aim of the study remains as relevant today as in 2010. This study aimed to gain in-depth understanding of the CI process in firms and the link to decision-making – this remains a useful research aim in 2015 and each of the contributions noted in Section 8.3 are valid in 2015. In addressing this time of research limitation, the researcher undertook a follow up interview with Swisscom strategic analysis in November 2015. Appendix VI.C clarifies the continuing contemporary relevance of this research by identifying that a)

the scenario analysis outcome proved relevant to the external strategic direction taken by Swisscom in the past few years and b) a greater focus on facilitating processes such as communication frequency and networking has emerged in recent internal firm actions to support CI activities.

Despite organisational and technological changes, the dynamic frameworks identified in this PhD study remain relevant, as noted in three areas – first in the more comprehensive illustrations of the CI process in action through an integrative CI Activities framework, set out in Figure 3.4; second in the mapping of organisational patterns to the CI process in Figure 7.2 and in the representation of CI Analysis methodologies in Figure 6.2 and the illustration of how Adaptiveness can be designed into CI processes in Figure 7.4 could lead towards a greater adaptiveness of activities to dynamic market conditions. The Integrative CI Activities framework enables a better structuring of the CI process within firms, the organisational mapping process is applicable to other sectors and the evaluation of effectiveness of CI processes can be carried out in other organisations. These frameworks can enable other firms to map their CI process, regardless of firm and market variation or lapse of time. The focus within the dynamic theoretical frameworks and the adaptive process representation offers significantly more specification of the CI process and its constituent elements than previous studies.

Annual data for the secondary data analysis were limited. Only 39 data points were available for the statistical Vector Autoregressive Model (VAR) at the time of the interviews in 2010. Federal statistical departments in Switzerland only recently started to collect ICT data. Forecasts for telecom firms from Germany and USA were calculated but not presented as these were of very limited validity due to the small sample size of the available annual data (approximately 20 data points). Deutsche Telecom was further investigated to see if they have a structured approach to observe the market, which was the case (Deutsche Telekom 2005), but it did not include indicators and market scenarios, which shows the potential to be further developed. In future research, it could be possible to have a more complete database to further validate the results.

Nonetheless, the findings from the scenario analyses that was conducted are robust. The scenario analysis of this study suggested an approach that was relevant to one firm – these suggestions regarding the need to address potential new entrants and embrace rapid technological change remain valid. Furthermore, the scenario analysis method is a relevant CI analytical tool today – the nature of CI activity has not changed – the rapidity of external market change and the intensity of competition still exist in firms that were encountered during the data collection phase.

8.6 Proposals for Future Research

Future research could take the Integrative CI Activities framework and examine, through longitudinal case studies how the organisational structures supporting the CI processes evolve in similar European telecom firms. As has been shown, the impact on decision-making changes as the CI process develops in firms, dependent on the resources made available by management to their CI teams. From findings in this research, we might anticipate that, in future, CI analyses are likely to become more flexible and sophisticated, with a greater degree of impact of CI outputs on key firm decisions. It would be useful to document this transition.

A worthwhile lens of analysis in future research would be on the CI analyst role. We have seen that the CI Analyst role is evolving and that there are different forms of CI team organisations, some with more explicit and others more implicit characteristics. A larger scale study with CI Analysts across three comparative sectors could offer benefits in terms of a greater understanding of this key role. Focus on how the role is evolving at sector level, how the firms of CI analysis associated with the role are becoming more sophisticated, and how the CI Analyst is becoming embedded into the strategic decisions of a firm.

Finally, future research could investigate scenario analyses for telecom sectors from other countries with similar characteristics. Existing analyses on the telecom market focus on products and services (fixed telephony, broadband, mobile phone, VoIP), but put little emphasis on indicators which potentially predict future directions in the telecom sector (Brambilla 2010; Brändle *et al.* 2012; ETEC and OFCOM 2010).

The findings from this study offer some good comparative value for sectors with similar technology challenges and who have an oligopolistic market structure. This PhD study has looked at the interplay of the strategic and operational perspectives of CI in firm's organisation. The management model of St. Gallen sees the firm as system with the internal perspectives for management with normative, strategic and operational dimensions (Bleicher 1999). It remains for future studies to investigate the normative perspective of CI and its interplay with the other two perspectives.

8.7 Conclusion

The adoption of three 'lenses' in this study; notably, a) the use of the Integrative CI activities framework to examine the nature of the CI process; b) the examination of organisational structure/attributes and their supportive role in CI activities and c) the investigation of the link between CI and management decision-making has led to significant insights into the implementation of the CI process. In particular, what has emerged is a greater contextual understanding of CI.

Key frameworks have emerged as a result of this study that can enable future research to take aspects of this study further. From the first lens of analysis, a new framework called the Integrative CI Activities framework was developed that enables a detailed blueprint of the CI process in firms to be drawn. From the second lens of analysis, the examination of the link between organisational structure and CI analysis has offered in Figure 7.2 a way to map the CI process according to organisational support patterns and to clarify at what stage an organisation might be in terms of their CI process development. From the third lens, a useful framework for considering CI Analysis Methodologies has been developed (see Figure 3.2). In presenting a framework on CI Analysis Methodologies to reflect potential combined analysis tools, this study addresses an area noted as important by O'Brien *et al.* (2007), in their argument of the need to use analysis tools in combination for specific CI purposes.

In addition, a workable predictive analysis has been developed that can be applied to strategic decision-making and this is replicable across other sectors, enabling firms to adopt more dynamic CI analysis, which involves CI data transformation in the light of

predictive market changes. In advocating the need for more dynamic CI Content to be generated by CI analysts, and outlining how that depends on priority setting techniques, market forecasting and on scenario analysis, the study identifies the most critical area of contribution of CI to contemporary firms – how to transform intelligence in order to effectively respond to disruptive market changes and targeted competitive threats.

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Appendices

Appendices I to V

Appendices I and II show examples of an interview transcript and a checklist completion for Swisscom. Appendix III to V include a preliminary interview coding example, a coding tree and evidence of how themes were clustered following an iterative content data analysis. Appendix shows transcripts from two follow up (email) interviews with Swiss analysts from 2015.

Appendix I Interview Transcripts: Example Swisscom Pair Interview with Analysts 2 and 3

Date of interview 14/04/2010

Introduction

Overview: Organisational structure of market research / CI activities within Swisscom. This is done within different departments of Swisscom Corporation.

Analyst 3 introduces Swisscom and the respondents. He works for the department Strategy & Business Development of the Swisscom Group. In 2010 the organisational structure consisted of Swisscom Switzerland, Swisscom IT Services – one of its departments –, and Fastweb – a Swisscom daughter in Italy. Swisscom Switzerland consisted of different departments. One of them is Residential Customers, which Analyst 2 is working for. There are also other departments dealing with CI. These are: Corporate Business, Strategy & Innovation, and Network & IT for Swisscom Switzerland; Swisscom Corporate Strategy & Business Development, and Swisscom IT Services add to that list.

1. Please describe how Swisscom processes competitor information.

Analyst 2: At Swisscom Residential we apply these things. A huge part is the Internet information is coming from. There we have certain tools monitoring the competitors, there are newsletters or feeds for that task, and other tools monitoring entries into the Commercial Registry to see if there are changes of persons or new firms acting in our area. These are the most used sources. Apart from this the employees are very important learning something, getting direct mails from competitors, new products or things like that passing over that information to us.

Question: You talked about gathering information, what are you doing with the information?

Analyst 2: There is a daily newsletter for Swisscom Residential and for interested person from other departments containing all this information. There are ad hoc assignments answering questions and it can go that far that they also result in giving recommendations how to act. But to observe the competitors is a small part, which can be enriched with other information we

have from Swisscom as for example results from market research, secondary studies, and others.

Analyst 3: This is now the view of Residential Customers, the whole thing also exists analogous for IT Services or Fastweb. The whole thing is decentralised to be close to the (internal) customers. There are only few centralised issues as for example Forrester, Gartner, which is centrally bought.

Question: You talked about ad hoc procedures according to the situation, how does this occur? Is this decentralised or does a basic process or structure exist?#

Analyst 2: There is no certain structure apart from our team is newly called “Market Intelligence” and because we send out daily newsletters, we have reached a certain publicity and because of this I reach the person directly or my superior gets a request, or our team mailbox, if we can do something like that. There are certain queries or projects, which are prioritised, so called key projects, which get more resources than other projects, as they have the highest priority. But there is no predefined process it just adjusted like this.

Question: Analyst 3, do I understand you correctly, you are a user of the information?

Analyst 3: Yes, on the one hand, I use the information of Analyst 2, I am a reader of his newsletter, but I also use secondary studies, or market research studies, but my tasks have another scope, it is for the Swisscom Group it is mostly outside of Switzerland, it goes into other business areas. Besides the core business – telecommunication – it goes into areas as advertisement / medias, or different geographies, or new issues as electric vehicles or things like that. Because of this, I have a bit different contents I am working at. Most of the queries are concerning Switzerland because this is our main market.

Question: And apart from that, you do your own research?

Analyst 3: Exactly. On the one side, for foreign countries less market research is done as for Switzerland, but it also happens, that we settle issues directly at us and make studies from them. It also happens that we use secondary research, e.g. expert judgements for new technologies, so we do not have to read in that deeply, or that my colleagues from the Group Strategy have direct access to the data. If they want to know something, they have direct access to the sources and can make their own pictures. [Clarification: this is the case at the Group Strategy (= very small team) and not in the bigger departments -> there only the seat holder has direct access to the sources]

Question: So, they access the sources, by which means are they centrally stored or provided?

Analyst 3: Exactly. Very often this is a log in, for example at Forrester, where you can access reports. It is also important to decide, who should access which sources. Should everybody access all the sources? At us this is solved such that not all the information are accessible to everybody (Clarification: only the seat-holder have direct access to the reports; the research providers offer their services often on a seat based business model; a company wide licence (everybody can access their research) is often much more expensive). This means, one should

research focussed at the various concerning issues. My tasks contain about a 90% ad hoc queries. There are very few repetitive issues, which are coped framed into Newsletters.

2. Please describe how Swisscom uses their information systems (CIS, MIS, MMS, KM, DSS, others).

Analyst 2: A CIS: we in our area have a so-called “Competitor Radar Portal”. This is a portal accessible from the intranet. All the information from Switzerland, but also Europe is stored there such that people can collect them using a search function. These information is openly accessible lets say news alerts, or dispatches from newsletters, newspapers. This kind of information is fed into the Competitor Radar Portal. Documents as for example secondary studies are not retrievable from there. On the one hand, it is not legal due to the treaties that these documents are published at the intranet, that is why just information accessible to everybody are stored there, and everybody could find this information even without that system. But it is good that it is centrally stored and with a search function issues from the past can be retrieved very quickly.

MIS: we have that at Swisscom, it is also a portal on the intranet. This is the entry portal into all the financial reports and reporting, which are mainly provided by the controlling for Swisscom. And there the access is very restricted to selected people, which means, who can look at which reports? For example the product managers can look up very detailed information for their products, but somebody from a higher management level has special reports with aggregated digits so they can take them for further use. So, apt for each level the reporting is provided.

MMS: I do not use this but I know it is done mostly within Business Intelligence in the area of data mining it is worked with certain algorithms and it is tried to prepare the data such that they are better understandable. [Clarification: they are working only with aggregated data (not individual information)]

KM system: it exists beside the Competitor Radar Portal, there is a site at the intranet publishing certain internally produced studies. To view these studies, one has to apply for an access.

DSS: I would not call this a system. We amend certain recommendations through personal contacts, or through key findings from ad hoc requests or researches. As said, these are recommendations, but I personally never encountered a process or that one would be invited when it concerned an important decision. It happens merely through a written or personal contact.

Analyst 3: from my side, there is not much to add (4.07). At us, everything is much smaller, we are 5 – 6 people, the decision makers are all very close to our team. We send them the adequate argumentations and presentations within a dossier. We have a system to store our issues but there is a lot very confident information, which many people should not know about. So 20 000 to 30 000 employees should not quickly access this information. Some information can go outside, but most is within a small confident area at us. As we just access this area, it is enough to store it within a “normal” deposit within a shelf in file folders.

Question: You talked before a lot about portals. Are there software solutions or procedures you follow for the CI issues you have identified?

Analyst 2: Software solutions in this sense, for example the Competitor Radar Portal has been developed internally before I was a member of this team. It is very functional, concerning the design it does not show the latest standard (laughs), and the MIS, as much as I know, it runs over Microsoft Sharepoint, I am not sure about that, but it has various functionalities of it apart from the lack of being able to track versions and the option to edit documents. But viewed from the structure to deposit documents, it reminds me at Microsoft Sharepoint.

Question: And Decision Support, is this based on experience (perhaps explore “gut feeling” or instinct), or do you have certain procedures in this area (e.g. setting priorities, utility analysis or whatever).

Analyst 2: Well there, as I mentioned, one looks which information is available from the market, from market research, are there other information, which should be packed inside? If there are bigger projects, a recommendation is provided from the project team. This is all given into a board, which will decide “yes we do that” or “no we don’t”, or “yes we do it, but, here and there we should go further”, but in this sense, a System, where you can press a bottom and afterwards it comes out “yes this is successful” or “no it is not successful” does not exist.

Question: Are there any processes, or steps, which are structured? Pre- structured ptocesses or anything like that? Do you have any Decision Support tools?

Analyst 3: if one has a project, one calculates business cases or things like that, which is given before hand, what is required for a business case. Depending on the issues, there is a lot of information about the market required, but it depends very much on the problem to solve, but is nothing systematic. There are processes for product development, which are very much systematic. There are milestones for certain points, which are amended with certain documents. At projections, there is a lot of information requested about the market, the competitors to be collected, which is tightly directed. But how this information is collected is not directed. The easiest case is within the traditional core business within Switzerland, where we have a lot of information about the market. If there are queries how this and that looks like, we can use customer data. In principle the project responsible is responsible about these issues, and he knows whom to ask.

Question: A last point concerning this question (laughs): Would you describe the approach as independent, or do they have connections? [For example, with a single log in, can you access all of them, shift data from one of them to another, or are they fully independent?]

Analyst 2: I must say most of them are independent because they are administered from different teams. What surely is connected is the MIS with all issues coming from the data mining, so the systems generate automatic reports, and weekly or monthly updates. But the other issues not containing just digits are as far as I know not interlinked.

3. Please describe how Swisscom communicates subsequent information. Describe, which people and systems are involved.

Analyst 2: As different the information can be, as differing is the subsequent sharing out of information within the organisation. One way is surely that project teams introduce their issues to the boards the decisions are made, this happens sometimes within presentations, then it also happens daily through newsletters that information is carried out into the organisation, then what also happens that a lot of information is retrieved, the concerning people, who know that they can find this information there, go into the Competitor Radar Portal or the “INKA” Portal. So either it is a one to one communication, the information is sent to them or they retrieve it by themselves. This is the most common way as occurred to me.

Question: You mentioned an “INKA” Portal? I did not fully understand this.

Analyst 2: This is just the MIS.

Analyst 3: At us, there are differing ways. What Analyst 1 probably mentioned, there are strategy processes, looking at different problems by the board of directors, and very often the competitive situation in Switzerland, and here the information is systematically concentrated and presented to the board of directors. But mostly there are different strategic questions about the future and then there are presentations, one seeks to find answers to various scenarios, and it is difficult to show a typical case. But there is a lot of information about the competitor and the market fed into that. There are also questions about for example Fastweb or new investments, where we try to find out answers if this could be interesting for Swisscom, or to settle a partnership, to invest into a market. These are project teams looking at those questions and present their results, and depending how important this is, it can go to the corporate management, or later to the board of directors or also to the federal council, which has to be informed beforehand for example. Depending on the importance, the procedures are different, and it does not necessarily to be me presenting the results. I work in a team with different persons, and most of the time there is somebody else [Clarification: the project manager] presenting the results to the corporate management, but it is difficult to present a general process.

4. What type of information serves as an early warning indicator?

Analyst 2: On the one hand alerts from the market, on the other hand trade register entries, if there are new firms, further building licences or better building petitions for mobile wireless antennas, further employees giving us feedbacks whenever they hear or see something, or may be even when they received a call from a market research firm learning there is a new product from a competitor. So these are the most important ones. What also occurs is that for example at frequency licence auctions one looks, who is bidding, and to whom the licence goes. If these are well known firms from the market this is fine, otherwise one thinks about, if these are new entrants. Things like that, but these are long-term issues especially at licence auctions because it takes time until a net is build up, until commercial offers are launched, it takes time. But this serves very well as an early warning system.

Analyst 3: As an amendment from my view, an early warning system is the stock price developments or other events for example rumours from the stock market, or in general what happens in the sector globally or in the European market. Often there are certain trends apt for

conclusions of issues that will come to Switzerland sooner or later. So this is when it is about the consolidation of markets and so forth. Often this starts in other countries with similar structures so one can conclude this happens sooner or later in Switzerland as well. One looks at it from the technological side or has external sources analysing the latest technologies and trends. So one can see what comes from the technological side as a threat or chance.

Analyst 2: Exactly, this is what I forgot to say, for example if there are corporate competitors globally or Europe wide active market one looks a bid outside of Switzerland to learn which are there offers within the market or new services not yet available here. So the chances are higher that this comes to Switzerland as well, as if they would not be active in this area at all. This goes in the direction that activities the sector are monitored. The Swiss market is too small to give impulses for the whole sector globally.

Question: You talk about new technologies being already on the market. How about patents? Is this also monitored or is this not an issue?

Analyst 3: I would say this is primarily an issue of our suppliers or from the manufacturers of the devices. But when it is about technologies as infrastructure issues as mobile wireless net, or the area of fixnet, fibre network, or roll out, then the global suppliers are the ones offering this infrastructure, then one searches what is on the market but less a revolutionary technology. I was occupied within this market one looks how to bring fibre to the households at low costs. One can monitor what happens there but this is less about the area of patents or one buys a service. There are certain technological developments coming out from Swisscom, which are researched and then patented, but we do not screen all areas of the IT and telecommunication market.

5. Overall: Please describe how Swisscom processes CI communication.

Analyst 2: Very often on a daily basis through newsletters as distributed emails, bigger assignments are presented, or distributed in the form of PowerPoint files, or personal information with the client we communicate him the results. What is additionally supplied are the various portals where the persons can search and retrieve the concerning information by themselves.

6. Overall: Please describe how Swisscom designs and realises CI information flows.

Analyst 2: Standardised processes for the information exist for example at the product development process. Depending on which state of decision one is, information already flow inside, but this is directed by the project manager obtaining the respective information at the relevant places and within this process they are carried over to the boards. Standardised processes in this sense do not necessarily exist for information flows as we said it is more that out of historic reasons certain information channels are used more than others. Certainly once it was thought in detail about how to process the information, but I cannot commend on this as this was before my time (at Swisscom).

Question: We already considered the flows of information between systems, obviously with the portal solutions there are good links for certain issues. Are there less informal information flows?

Analyst 2: One can say ad hoc information flows, but there is that people give assignments to other on the basis of assignments, which go back to them. But these are limited by time and not standardised. It is just that there is one team, which they know they can fetch this information, they approach this team, and their assignment is attended, sometimes with a bid of consultancy, and then the assignment is completed.

Question: Are assignments query-based?

Analyst 2: Yes, partially one can say so.

Question: Is it more or less work to work in a query-based manner on projects?

Analyst 2: Yes, apart from the systematic observation of the competitor for the information for the newsletters it is surely the largest part.

Question: Do you get feedback from the people who give an assignment afterwards?

Analyst 2: When an assignment comes by email, I have a quick consultation with the client, may be I say: “this is possible, that is not possible”, then we agree, which points are investigated, then one does this, and most of the time there is feedback: “it was good, it helped me”, or “here and there I should get deeper or more information”, and may be it occurs – but this occurs rather seldom – that one works directly in the project for a certain duration, until a concerning phase is completed and there one has the feedback directly.

Question: Ah you directly engage with the project teams and work with them.

Analyst 2: Exactly.

Analyst 3: At us everything is project-based. The main part of the requests or assignments is solved like this. Mostly it needs several iterations, where it is not given that the assignment is fully clear from the start, and not changing. Most of the time, one sits and creates various steps.

Question: I suppose you use the feedback you get for the upcoming assignments?

Analyst 3: There is also feedback one has to think about the quality of the sources. For example, our desk research used an information provider for several times, but this is unusable. This is an ongoing process where you get feedback concerning your own work but also to the sources. It is not carved in stone that there is just this source there are also others, so it is a continuous observation.

Question: I have again a question about KM. As you have to work in those feedback continuously, do you have the option to write this down into a KM system or is this rather implicit knowledge you apply in the future?

Analyst 3: This is merely implicit knowledge.

Analyst 2: For me this is implicit knowledge.

Analyst 3: For example, when I do a benchmark about the European telecommunication market I take certain digits and then I notice the data deliverer is not that good, I look, if there are other

sources to provide the data. But also here it is not systematically. It concerns few people, an area which can be overseen. This is an important point that we can exchange our experiences.

7. What system for Swisscom links competitor information with its SDM process?

Analyst 3: Within Swisscom there is a strategy process. In the earlier days, it was done at certain situations, where comprehensive strategic reports/presentations were written. Today this is merely done in a query-based form. Certain strategic questions are cleared up with different strategic tools. This happens at the corporate level of Swisscom, but also for certain departments or subsidiaries. These questions are very concerned with the competition, with the market, and within this frame, all the collected information flows in. Our strategic departments replies this kind of questions and we access the concerning positions and tell them how get the information. Then they become active and search the information. They can do this through the portal, if this is about general issues, or if there are specific requests, these are ad hoc requests.

Question: So has this changed recently, - in the last few years? Before, it was as you said, the presentations, and now it is also solved in a query-based way.

Analyst 3: At the end, this also happens, but then there are 4 to 6 different questions, which are compiled together with the corporate management first and then with the board of directors. These are important questions which Swisscom is required to answer. These are strategic questions with a long-term time horizon, and not the same questions every year. There is basically a contradiction to work on strategic questions every year, but there are always new questions, which are considered in detail. These can be questions concerning how the situation in the Swiss market will develop. For example, various scenarios can be compiled and then presented to the board of directors. These are not just scenarios but also recommendations how to act, which can be derived from it. This is heavily query-based; one has the impression that the board of directors want answers to them. He wants answers to the most urgent questions and not every time this huge strategy document always providing the same content.

Question: This is once a year or once a quarter?

Analyst 3: This is in principle once a year. Sometimes it happens that not all the questions can be answered at the same time, so it is subdivided on the meetings of the boards of directors. Some questions must be delayed when they for example are concerned with resources or if certain “political” decisions are to come. Here one is relatively flexible.

Question: How do you assess the importance of information about competitors compared with other issues?

Analyst 3: It depends very much on the question. If it is about the market situation of Switzerland, it is very important information. It is good to have a good basis of what the competition has done in the past. On this basis the scenarios are developed. There are various techniques applicable here. Then there are totally different questions going into other very important issues. But the core market Switzerland and its competitive environment is a basis for

our business. For example if there is a fusion between Sunrise and Orange it is good not only to learn that through the news press, so we can run through it beforehand.

Question: Before, you briefly mentioned scenarios. Can you describe your analytic toolbox or those tools you use mostly?

Analyst 3: There are the standard tools from Porter, and analysis like SWOT. Sometimes it is this one and other times that one. I cannot say which one is used most. It depends on the question. Most people who work in the strategic environment know and apply these tools accordingly, if they have the impression, that this one is a good tool to present and analyse this question. I have the feeling what is really centrally is the presentation of the results afterwards. The good presentation is not about the colour of the boxes, but to have a good story, which is easy to understand. If one thinks at the board of directors, these are people who are not coped just with this issue. They come to a meeting, and on a simple way, very complex contexts should be explained. This is very important. Also one should explain, what has been done (to achieve this results). It should not be a black box with a histogram and then one is not able to fully explain how it came to this. One first should read in the issue and work on the scenarios.

Question: Probably you have a broader range of analytic tools. Some other organisations use game theory or develop cost-benefit analyses- where do you stand on using advanced tools?

Analyst 3: War gaming has been done in the past. I cannot say how often it has been done and how well it was accepted, but I imagine that here there are procedures, which become actual and then they are played through. It is good, if one has experienced a war game to see what can be achieved with it. But it is not systematically that one says: “within the strategic process there are this and that questions and here we must use war gaming”. The questions are in the foreground and procedures or analysis come downstream. One also asks: “is the effort justified to use the tool war gaming?”

Question: Do you use other analytical tools regularly, other than scenario analysis and SWOT? Less common analysis approaches?

Analyst 3: Sure, it is a bit difficult to now assess all the strategic tools of Swisscom Switzerland. I am not sure which activities are performed in detail. But I think in principle, this is very broad. People with different backgrounds (10:46) are working on it, and when one has the impression that here is something one should apply this is done. This is difficult for me to evaluate, because in contrast to desk research, I don't have the overview.

Analyst 2: What I surely can say is that there is not one tool or model, which always has to be applied. There are no requirements that the results should all be presented in the form of a SWOT analysis. As different as the people are at Swisscom, as different are the models they apply. Some are fan of the five forces model of Porter; others prefer to make analysis with the management model of St. Gallen, where an economical system can be portrayed. “The” tool, one has to apply does not exist, one can use it very often but it is not a requirement.

Question: The requirement is that in the end it should be easy to understand and logically conclusive?

Analyst 3: And clear, yes. A good story one can narrate, so the feedback should be: “I would have done it the same way, if I had to do this task.” All people should stand behind that strategy, so it is understandable, if one is in the senior management or having another function in the firm, it should be clear to everybody, so everybody can go in the same direction. This is the central point of the strategy.

Question: And these strategies: short-term would be may be one year, mid-term to long-term two to three years or do you see bigger horizons?

Analyst 3: For different issues, the time frame is important. Trends are also considered. Here also trends with a longer time frame can play a role. To buy companies has an effect, which can operate within a longer time frame. This is surely also considered. Other issues, concerning the infrastructure, for example the basic net, the time horizon can be 20 to 30 years in the future. The investment is that huge that it is not possible to provide something new after 5 years. From this aspect, one is forced to think for longer periods. This is viewed from the issues, but there is also long-term financial planning. The next two years, this is what the shareholder is concerned with: “how is 2010 and 2011 looking like?” Internally we do look further, to 2015 to 2020. According to this our strategic work is focussed. But it depends on the question. There are short-term issues.

The two interviewees piloted the checklist after the interview. The resulting checklist was then answered during a second meeting.

Appendix II Checklist: Example Swisscom's Strategic Analyst 3

A printout of the checklist was handed out to the interviewees directly after the interview. The researcher was present to answer possible upcoming questions directly. For Swisscom the checklist was filled out twice, as the interviewees from the pair interview volunteered to pilot the checklist. The first interviewee from Swisscom also volunteered to fill out the checklist after the pilot in a second meeting. For Orange the questionnaire was filled in from the researcher during a telephone interview, as the interviewee did not have time directly after the interview. Cablecom's analyst 8 left the interview early and filled out only part of the checklist. Despite several attempts (about 10) to let him fill out later he did not. Nevertheless, the given information from him could be used.

Organisational background CI Team and Information Analyst (IA)

- How many information analysts does your firm employ? Please indicate the number of full time and part time employed and full time equivalents of employed IA. Some IAs work only part time as IA while full time employed, please indicate the number of these part time IAs as well and estimate their full time equivalents.

Full time IA	Part time IA	Full time equivalent IA
✍ N° 2	✍ N° 5	✍ N° 4
<input type="checkbox"/> No information analysts currently or planned		
<input type="checkbox"/> I do not know		

- Which approach do information analysts mainly use to process competitor information? You can choose several options.

- Process Approach: Strategy Process from management
 Query Based Approach: Approach based on incoming queries, which can be repetitive
 Ad Hoc Approach: Changing approach due to tasks
 ✍ Other, please specify:

- To which levels do information analysts communicate intelligence? You can choose several options.

- IA report to Board of Directors level
 IA report to Marketing Managers
 IA report to Functional Department Managers
 IA report to Line Managers
 ✍ Other, please specify:

- In which department are your IA employed?
 ✍ Department: Strategy and Business Development

Process, Analyse, and Communicate Information, Act on Intelligence

This part of the questionnaire asks how your analysts processes information, analyses it into intelligence, and gives recommendations to Senior Management.

Strategic Decision-Making (SDM) can be structured into the following four stages:

- Setting strategic objectives
- Strategic analysis of internal and external conditions
- Strategy formulation
- Implementation and control of decisions

Systems can be used to support the following tasks:

- Competitor Information System (CIS): Gathers competitor data, transforms it into information, for example a portal solution.
- Management Information System (MIS): Provide information for planning, financial, and controlling operations, for example a portal solution.
- Mathematical Modelling System (MMS): Use mathematical tools and models to process, analyse, and transform data into information, for example Data Mining.
- Knowledge Management System (KM): Organise and provide internal information related to the development of new knowledge and insights, for example a wiki.
- Decision Support System (DSS): Set priorities, weigh alternatives, evaluate preconditions, and give recommendations, for example a software or template.

5. Which systems are employed in your firm to process information?

- Competitor Information System (CIS)
- Management Information System (MIS)
- Mathematical Modelling System (MMS)
- Knowledge Management System (KM)
- Decision Support System (DSS)
- Alternate system name(s):

6. If the introductory description does not fit the systems of your firm, which other systems do you use and how do you call them?

- Description fits to our systems
- Alternate Systems and short description of purpose:

7. Which of your systems requires training before use? If no training is required, please chose "none".

System	CIS	MIS	MMS	KM	DSS	Other System	None	I do not know
<input type="checkbox"/> Software training	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> Analysis training	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> Other training, please specify: <input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

8. Which issues do you process and if applicable which systems do you use?

Purpose \ System	System							
	CIS	MIS	MMS	KM	DSS	Other	None	I do not know
<input checked="" type="checkbox"/> Monitor Competitors	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input checked="" type="checkbox"/> Monitoring Environment (markets, regulations, customers)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input checked="" type="checkbox"/> Data testing and predicting	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input checked="" type="checkbox"/> Analysis procedures	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input checked="" type="checkbox"/> Managing Internal information	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input checked="" type="checkbox"/> Other, please specify:	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

9. Please identify, which analysis techniques (for example SWOT, five forces model etc) you use and if applicable in which system this occurs.

Purpose \ System	System							
	CIS	MIS	MMS	KM	DSS	Other	None	I do not know
<input type="checkbox"/> SWOT	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> Five forces model (Porter)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input checked="" type="checkbox"/> Other analysis, please specify:								

10. Please identify, which decision support techniques you use to provide recommendations for SDM and if applicable in which system(s) this occurs.

Purpose \ System	System							
	CIS	MIS	MMS	KM	DSS	Other	None	I do not know
<input checked="" type="checkbox"/> Set priorities	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input checked="" type="checkbox"/> Weight alternatives	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input checked="" type="checkbox"/> Evaluate preconditions	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input checked="" type="checkbox"/> Other, please specify:	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

11. Please indicate which stages of SDM your systems support?

Purpose \ System	System							
	CIS	MIS	MMS	KM	DSS	Other	None	I do not know
<input checked="" type="checkbox"/> Set Strategic Objective	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input checked="" type="checkbox"/> Strategic Analysis	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input checked="" type="checkbox"/> Strategy Formulation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> Implementation and Control	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> I do not know	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

12. How much do recommendations (as asked in Question N° 10) influence SDM?

Influence	Very Much	Somewhat	Very Little	Not at All	I do not know
Stage of SDM					
Set Strategic Objective	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Strategic Analysis	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Strategy Formulation	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Implementation and Control	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

13. Please give an example of an action you take as a result of decision support output?

✍ Example: evaluating the launch of a low cost brand for the broadband market

14. In your view, how technically sophisticated are your systems taken together?

Sophistication	Very Much	Somewhat	Very Little	Not at All	I do not know
System Feature					
Processing Data	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Analysing Information	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Supporting SDM	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

15. In your view, how effective in terms of appropriateness and timely achievement of tasks are your systems taken together?

Effectiveness	Very Much	Somewhat	Very Little	Not at All	I do not know
System Feature					
Processing Data	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Analysing Information	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Supporting SDM	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Early Warning Signals

16. How many new competitors did you intensively monitor during the last 3 years?

✍ Number of new possibly dangerous competitors: depending on the market: 2-5 in the main markets

I do not know

17. From your view do the following issues have impact on your firm growth or performance (turnover, profit, or sales revenue)?

Issues	Growth Impact					
	Positive	Mainly Positive	None	Mainly Negative	Negative	I do not know
Existing Competitors	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
New dangerous Competitors	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Competitors' new Patents	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Competitors' new Product launches	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Own new Patents	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Own new Product launches	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other, please specify:	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

18. Please give an example how you act if an issues has impact on your firms' growth?

Issue	Action	No Action	I do not know
A new dangerous Competitor enters the market	Depends on the market entry strategy of the new competitor... entering the core market of the new competitor	<input type="checkbox"/>	<input type="checkbox"/>
A competitor gets a new Patent	<input type="checkbox"/>	<input checked="" type="checkbox"/>
A competitor launches a new Product and takes market share	Launch of a similar positioned product...	<input type="checkbox"/>	<input type="checkbox"/>
Other (as specified in N ^o 17)	<input type="checkbox"/>	<input type="checkbox"/>

19. How quickly do you take action (as asked in Question N^o 18)?

Issues	Time to act	I do not know
New dangerous Competitor	<input checked="" type="checkbox"/>
Competitors' new Patents	<input checked="" type="checkbox"/>
Competitors' new Product / Service launches	1-3 months	<input type="checkbox"/>
Other (as specified in N ^o 17)	<input type="checkbox"/>

20. How many Products / Services, and Patents does your firm and your main competitor hold and bring new to market? Please estimate, if you do not have the exact digit.

	Total before 2009	New since January 2009	Planned for 2010/2011	I do not know
Number of own Patents	<input checked="" type="checkbox"/>
Number of own Product / Service launches	<input checked="" type="checkbox"/>
Number of competitors' Patents	<input checked="" type="checkbox"/>
Number of competitors' Product launches	<input checked="" type="checkbox"/>

21. What was the turnover of your firm in 2009?

✍ Turnover in 2009 in £: 12,001 m CHF

Overall Remarks

22. Please give your overall remarks about using Competitor Intelligence for SDM below.

✍ Not answered

Thank you again for your time and patience it is very much appreciated

✍ Your Job Title: Research Analyst

✍ Your Department: Group Strategy

Appendix III Preliminary Coding Interview Orange

The interviews were coded in a preliminary way by scanning the interview questions and looking for matches in the text with the preliminary theoretical concepts related with CI Activities. The example of Orange illustrates that step (See below). **Date of interview (20/10/2010)**

1. How Orange Processes Competitor Information.

CI modules or alternate CI process	Data gathering (L11) ¹ Data analysis (L28)	Sources (L9) Partial information (L10)	Guessing (L12)
Specific intelligence requirements	Typical approach (L17)	Data gathering, guessing, insight (L12) Valid for defence (L18)	Insights and intelligence on it (L16)

2. How Orange uses information systems (CIS, MIS, MMS, KM, DSS, others).

Information systems for data management: gathering, storage and analysis	Data storage (L121)	In divisions, in portals: internal data (KM) (L112), accessible from divisions (L120)
Develop systems continuously	KM is missing (L108-109)	But: Millions of KPI, we have that (KM) (L111)
	KM process for all projects KM process for all projects (L134-135); Centrally stored, accessible for all (L135-136)	Stages, submit, describe actions (why, how) (L133-134)
End users should use systems for the intended purpose.	Two levels: no portal at local level (L43-44)	Develop specific tools – excel spreadsheets (L44)
	Group level: Portal (L46-47)	Trends and tendencies (L45)
Ease of use and usefulness design	Data mining solution (L76)	Data mining team: extract data on request – customer relationship (L83-84)

2. How Orange communicates subsequent information. - people and systems involved.

Implicit - explicit knowledge		
Explicit approaches apply rules, models, and collaboration	Specific information – reports (L23) Other stuff: new launches (L25)	Ad hoc to process (L29) No structured approach (L345) Project process (L135)
Implicit approaches are informal (ad hoc), rooted in action, commitment, values and emotions	Implicit processes: file naming, access restricted by division (L117-119)	

¹ For Lines Number indication of Codes (L) refer to Transcript of Interview with Orange

4. Type of information as early warning indicator?

Detect and interpret relevant market signals	Two levels: France Telecom (L257-258) Other level (L262)	Footprint of France Telecom: other markets (L257-258) Specific competitor moves (L262)	Competitors (L446) technology (L285-286), new competitors (MNOs) (L294-295), Regulations (L272)
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5. Analytic approach or toolkit

Interpret information from the market	Apply internal framework (L407)	A general approach: levers (see checklist q9)
Variety of views on topics (focus and holistic), and analyses (predictive, evocative, priority setting)	Specific request (L421-422)	Positioning, pricing, portfolio, five forces (see checklist q9)

6. How Orange processes CI communication.

Formal CI units, feedback		
CI centre is a benefit for information flows	Central department (L34); central data mining team (L83); central market watch team (France Telecom) (L53)	Centrally located stuff what is done centrally (L248-249); (roof with pillars (L252-254)); technical analyses specialised (L37)
Feedback	Receive feedback on demand (L366-367), ad hoc (L376)	Feedback about conclusions, options, recommendations (L392)

7. How Orange designs and realises CI information flows.

Internal and external networks	Standard operation (L351)	Communicate to relevant people (L353-354)
Networks support organisational learning	Communication process (L360)	Strategic, tactical orientation for the whole company (L179-184)
Applications of advanced systems to support communication	No formal information flow (L357), no proper system (L359)	
Integrate communication and information systems	Recurring stuff (L360)	Process (L360)

8. System for Orange links competitor information with its SDM process?

Recommendations for turning knowledge into action	Information we can get out of other systems, or from our sources (L144-146)	Informal approach: positioning of competitor, how react (L435-436)
		strategic framework (L432): approach through levers: understand market (L488-489)

9. Assess changes / developments since you work here

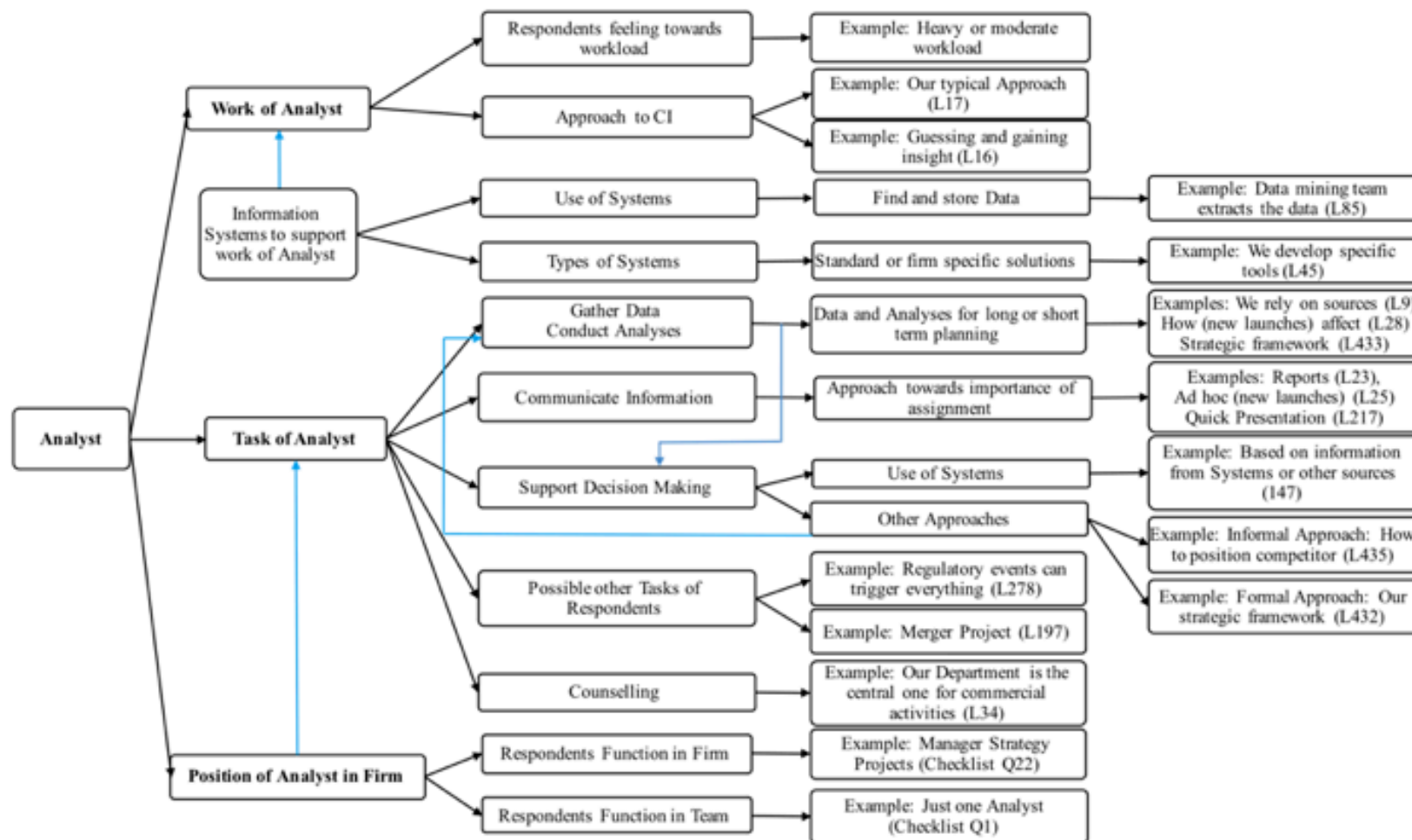
Recommendations for the development of firms	We develop tools (excel spreadsheets L44)	Knowledge of competitors, some aspects better others worse (L477-483)	
	System development (L499)	But knowledge has not massively increased (L495)	CI is a living beast (L499-500)

The data that emerged from this initial categorisation did not reveal the level of insight into CI Activities that the researcher hoped. Therefore, a more holistic reading of the text took place and a coding tree was developed to better show the experience of the respondents of CI activities in the firms (See Appendix IV). The coding tree was useful, but did not help to explain the variation of CI activities in the firms. Thorough axial coding of themes relating to all CI activities was undertaken. A number of patterns emerged that were then pursued through further interpretation. For instance, it was found that explicit and implicit approaches related with organisational patterns. This relatedness however did not explain why some of the analysts felt that their work was strategically important, whereas others expressed that their roles were limited in operational activities – and budget plans. This insight led to a third selective coding step to understand how analyses in the firms are done and which analyses could be possibly important but disregarded in the firms.

Appendix V shows a map that clusters themes from the case study data. Greater understanding of the scanning activities, of varied patterns in terms of effectiveness of CI processes and of how developing and developed CI processes were associated with different levels of CI Analysis – map variations are noted in Appendix V. The clustered themes map indicates how the researcher achieved a more integrated interpretation that takes account of all the data (Checklist, Interview and Documents) that were part of the case study approach. This offered a broader understanding of the complexity involved in CI at firm level. These insights led to developing the market context analysis and scenario analysis in Chapter 6 as a means of balancing our understanding of CI Activities in a turbulent market environment, with significant market disruption and aggressive competitive actions.

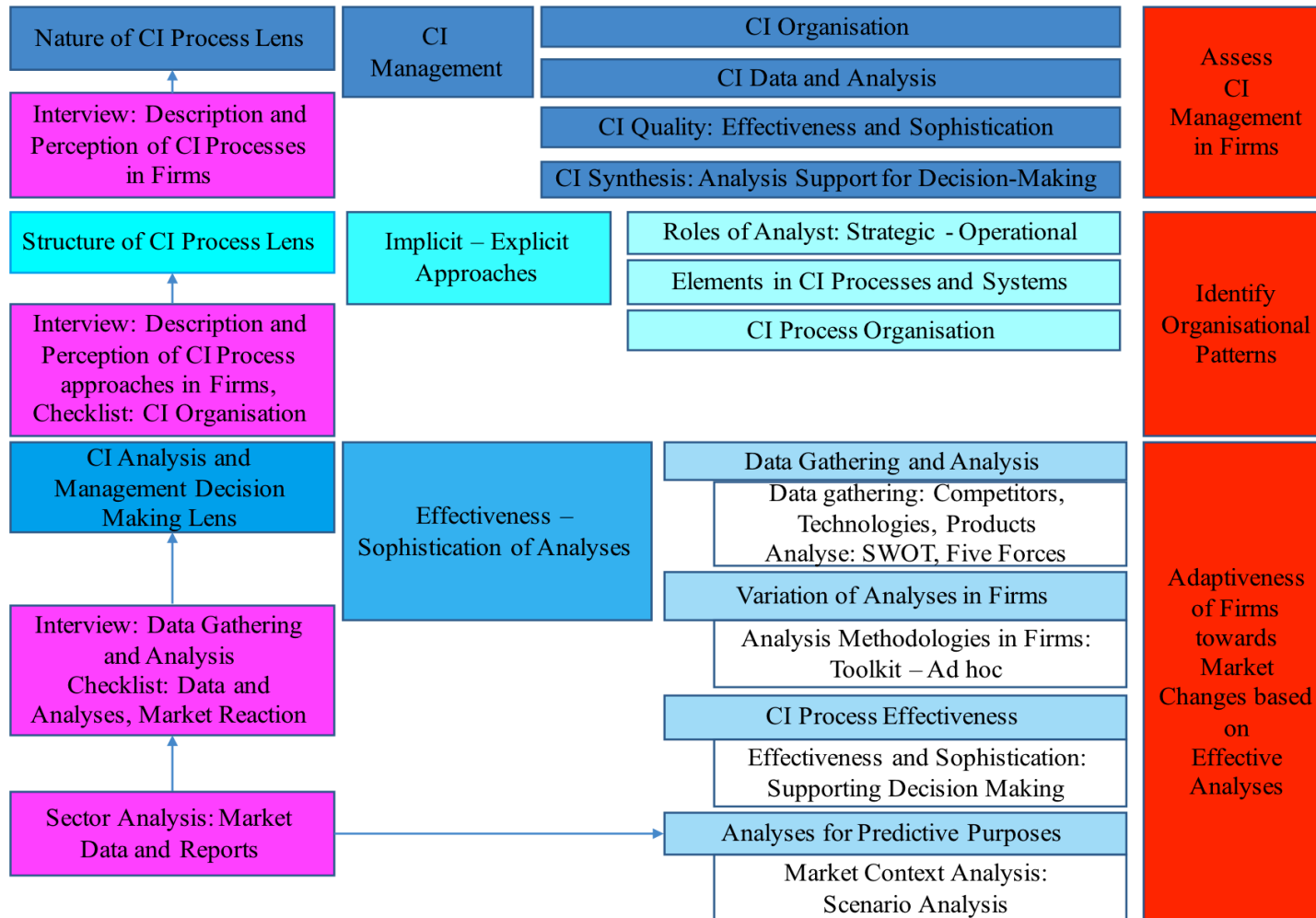
Some of the themes can explain the effectiveness of CI processes in supporting decision making, which is considered in Appendix VII.

Appendix IV Preliminary Coding Tree



Examples from Interview with Orange's Analyst are indicated with Line Numbers (L), Example from the Checklist are indicated with Checklist Numbers (Q).

Appendix V Clustered Themes and their Relationships in the Findings



Appendix VI Follow up Email Interview (2015)

A follow-up discussion with Swisscom's strategic analyst has taken place by email to identify how far the CI process has changed since the initial interview dates (2010). Below the discussion guide is shown, followed by a translation of the interview in English.

VI.A Follow-Up Interview Guide

Have the CI approaches changed during the last 5 years?

(Probe - What has been amended?/ What has continued?)

Strategy process: is it still query-based or changed?

(Probe : How would you describe it now?)

(Probe if strategy team prepares decisions and has the opportunity to escalate urgent issues)

Are the CI teams still organised in a decentralised way?

Do the teams concerned with CI still operate in the departments and is your team still active in the area of corporate

Are the systems still the same or are there updated processes or systems for analysis and communication?

Are the approaches towards analyses still the same? Do analysts still decide the choice of analysis tools and methods to employ?

(Probe: To what extent are there sophisticated tools available?)

Does the organisational change of Orange to Salt have impact on Swisscom?

Did the market undergo a crucial change?

There are some new, aggressive TV suppliers such as Green and Netflix, does this change influence the strategic attitude of Swisscom?

VI.B Transcript of Follow-Up Interview

Analyst 3, Swisscom, date of Mail (10/11/2015)

1) Have the CI approaches changed during the last 5 years?

Observing competitors and the market has become more significant; driven from the activities in the core market (changes on the side of the traditional competitors (IPO Sunrise [going public], change of ownership of Salt), new competitors, such as OTTs [Over The Top providers offer services for direct consumption such as voice messaging, TV and music and cloud

solutions for storage purposes, across networks and providers without subscription (Digiday 2015)] – often showing disruptive business models), additionally more activities take place outside of our core activities, making market- and competitor information very important (for example marketing activities, such as the joint venture for marketing with SRG [the Swiss federal Radio and Television Company] and Ringier [one of Switzerland’s main publishing house]), Siroop (joint venture of Swisscom with Coop [one of Switzerland’s main main retailer]), ehealth [Swisscom engages in standardising the electronic data exchange in healthcare (Swisscom ehealth 2015)], and energie [Swisscom supports customers to reduce their energy consumption with their green IT (Swisscom green IT 2015)].

He commented on more intense cooperation between the people in charge for market and CI:

- New ways to communicate (for example Blog) to improve distribution of analyses and insights, and to improve sensitisation of employees for market changes. In collaboration with controlling a regular competitor update is provided (quantitative and qualitative).
- The coordination of activities has improved
- Common portal solution (market information centre), a central storage of reports, studies, presentations, newsletters. This solution is the first contact point across all topics, it offers wide access, the idea of self-service is in the foreground.
- Besides competitor analysis: a central ‘market sizing’ at my desk (therefore in the area of corporate strategy), which is ONE source for market data. Market data and insights about the competitors are linked.

When asking him to detail ‘market sizing’,

‘market sizing deals with long-term market development of subscribers and revenues, and the development of market shares of the sub-markets.’

2) Is the strategy process still query-based or did it change?

Yes (still query-based)

3) Does the strategy team prepares decisions (opportunity to escalate urgent issues)

Yes, we carry also own issues (concerning content and process). Asking if he could give an example, he replied: *‘unfortunately no, this information is confidential.’*

4) Are the CI teams still organised in a decentralised form?

Yes

5) Do the teams concerned with CI still operate in the departments and is your team still active in the area of corporate strategy?

Yes

6) Do you still apply the same systems or are there updates and new ones?

There is a new central portal for knowledge management (see above: market information centre). Knowledge transfer with weekly newsletters, regular blog contributions, quarterly competitor updates in collaboration with the finance department....

When asked about blogs - Blogs have been introduced a while ago, we use blogs in many areas in the company, not only for competitive and market analyses).

7) Are the approaches towards analyses still the same, such that analysts decide about employed tools and methods (for example SWOT, five forces model, scenario analysis)?

Primarily for strategy purposes we use an expanded tool-set (analysis tools). This is a long list. Not each of these tools are relevant for competitive and market analyses. The question (query) defines the potential analysis tools.

8) In 2010 you mentioned that the analysts are conducting scenario analyses. May I receive some information (documentation) about that?

A few years ago I found sparse information in the Internet, a scenario analysis of Swisscom about the telecom market, but it disappeared shortly after. I would be very interested to have that analysis).

Yes, we do work with scenario analysis. For example, to picture and deepen possible scenarios of consolidation. Unfortunately, I cannot share these documents.

When asked if he referred to saturated markets when speaking of ‘consolidation’ or of specific products as for example net coverage, fibre net.

‘Consolidation: M&A activities, which lead to a reduction of the number of players, as for example a merger of Salt. with Sunrise.’

9) Does the organisational change of Orange to Salt. impact Swisscom? Did the market undergo changes (did rivalry increase or level off)?

Yes, rebranding, new aggressive price plans in terms of prices. A tendency that competitive intensity has increased, additionally the uncertainty about the next steps (for example in the area of fixed network).

10) There are rather threatening TV suppliers as Green and Netflix, does their presents change the strategic attitude of Swisscom?

TV: we keep an eye on global providers as for example Netflix or those not yet active in the Swiss market as for example Amazon. At the moment we see them rather as a complement of our TV offers. Our position can change in the medium- to long-term.

Local market: here we especially observe the offers of the cable wire suppliers (Quickline) [Quickline supplies glass fibre and multimedia services for a group of cable wire suppliers in parts of Switzerland see Quickline 2015], and UPC-Cablecom).

When asked if they make analyses as a result of observing potential competitors, he replied:

‘We observe actual competitors (local, national and international), and potential competitors. In general, the list of actual and potential competitors elongates. Not each competitor is looked at the same intensive way, additionally the frequency to make analyses varies as well.

VI.C Analysis of Email Follow-Up Interview

Concerning the CI process, a more recent interview with the strategic analyst of Swisscom confirmed the findings. He explained that they developed their emphasis on ad hoc elements in communication.

“[We have] new ways to communicate (for example Blog) to improve distribution of analyses and insights, and to improve sensitisation of employees for market changes” (Analyst 3, Swisscom, date of email interview 10/11/2015)

Their information systems now emphasised market information and communication.

*“There is a new central portal for knowledge management (market information centre). Knowledge transfer with weekly newsletters, regular **blog** contributions, quarterly competitor updates in collaboration with the finance department. (Analyst 3, Swisscom, date of email interview 10/11/2015)*

Asking to detail their new blog feature he replied:

“Blogs have been introduced a while ago, we use blogs in many areas in the company, not only for competitive and market analyses.” (Analyst 3, Swisscom, date of email interview 10/11/2015)

The increased emphasis on communication, and development of ad hoc elements, with a decentralised CI team organisation, Swisscom’s process developed according to the identified direction from the map on CI process with organisational variation (see Figure 8.1), justifying the chosen interview analysis method.

Concerning development of scenario analyses, Swisscom’s strategic analyst examined the scenario outcomes from 2010 and noted that optimum scenario matched developments in the market since 2010. It is noteworthy that their way to do analyses has developed:

“Primarily for strategy purposes we use an expanded tool-set (analysis tools). This is a long list. Not each of these tools are relevant for competitive and market analyses. The question (query) defines the potential analysis tools.” (Analyst 3, Swisscom, date of email interview 10/11/2015)

Their analysis lists supported their ad hoc approach, each analyst still chose their preferred analysis tools, but considered alternatives from a longer list of possible alternatives.

The identified Scenario 1) ‘technology driven world’, became main relevant in 2015, because of the intensified competition. Swisscom’s strategic analyst confirmed this:

Observing competitors and the market has become more significant; driven from the activities in the core market (changes on the side of the traditional competitors (IPO Sunrise [going public], change of ownership of Salt), new competitors, such as OTTs [Over The Top providers offer services for direct consumption such as voice messaging, TV and music and cloud solutions for storage purposes, across networks and providers without subscription (Digiday 2015)] – often showing disruptive business models), additionally more activities take place outside of our core activities, making market- and

competitor information very important (for example marketing activities, such as the joint venture for marketing with SRG [the Swiss federal Radio and Television Company] and Ringier [one of Switzerland's main publishing house]), Siroop [joint venture of Swisscom with Coop [one of Switzerland's main main retailer], ehealth [Swisscom engages in standardising the electronic data exchange in healthcare (Swisscom ehealth 2015)], and energie [Swisscom supports customers to reduce their energy consumption with their green IT (Swisscom green IT 2015)]. (Analyst 3, Swisscom, date of email interview 10/11/2015)

Specifically, asking if they still conducted their own scenario analyses, he explained:

“Yes, we do work with scenario analyses. For example, to picture and deepen possible scenarios of consolidation. Unfortunately, I can not share these documents. (Analyst 3, Swisscom, date of email interview 10/11/2015)

Asking, if he referred to saturated markets when speaking of ‘consolidation’ or of specific products instead, as for example net coverage and fibre net, he explained:

“Consolidation: M&A activities, which lead to a reduction of the number of players, as for example a merger of Salt. with Sunrise.” (Analyst 3, Swisscom, date of email interview 10/11/2015)

His answer has shown that their scenario analyses centred strongly around activities of competitors. The scenario analysis conducted in this research about the telecom sector complements what is being conducted in firms.

Appendices VII to IX

Appendices VI to IX offer further data analyses to support Chapter 5. The focus is on the findings in relation to effectiveness and sophistication and on implicit and explicit approaches to CI Activities.

VII Evaluation of Effectiveness

VII.A Criteria for Effectiveness from past studies

For CI, requirements are standards to successfully run and develop a CI process- in this study, they were adapted to the CI Process from previous studies in CI (see Section 4.6.4). IEEE (1990), the standard glossary for terms used in requirements engineering, provided a definition of requirements as stated below:

- (1) “A condition or **capability** needed by a **user** to solve a problem or **achieve** an objective.
- (2) A condition or **capability** that must be met or possessed by a **system** or system component to **satisfy** a contract, standard, specification, or other formally imposed documents.
- (3) A documented **representation** of a condition or capability as in (1) or (2).”

Applying this definition is to the CI Process, to satisfy conditions (1) and (2) analysts and systems must be effective in CI. CI Content and CI Management need to allow users to do their task and the system needs to produce relevant material to a good standard. CI Organisation is supportive, as it should help analysts to provide effective analyses. Condition (3) implies communication as results are distributed. An effective CI Process, as identified in section 5.6.4, emphasises communication for each CI Activity. IEEE (1990) just requires a document, but for CI a variety of outputs were identified as useful. BABOK (2009), an institution for globally recognised standards for business analysis, emphasised this as crucial in order to allow understanding any analytic activity. BABOK (2009) uses the term requirements as *statements of needs*. This can be applied to CI as well, as the analyst has to clarify CI needs. BABOK (2009) detailed business analysis when stating:

*“In order to **plan the business analysis approach**, the business analyst must understand the **organizational process needs and objectives** that apply to the initiative. ... In many cases, organizations will have **formal or informal standards** in place regarding how business analysis is done and how it fits into project and other activities. ... If no standards exist, the business analyst works with the appropriate stakeholders to determine how the work will be completed. ... The **business analyst must determine the process** that will be followed to plan the execution of businesses analysis activities.”*

Even though BABOK (2009) standards accept an ad hoc approach to overcome missing standards, they strongly recommend a planning phase before analysing. They claim that standards for CI Content can be provided from industry, firms, or the individual analyst. BABOK (2009) offers a wide array of applicable analysis methods.

This above explanation and description gives an overview of how CI requirements can enable an evaluation of CI effectiveness. It does not, however, identify which CI requirements of the Swiss telecom firms are to be met. This can be examined, based on past studies in CI. In this regard, key ideas are noted from a range of authors. The CI Process approach requires correct and applicable results based on plans (Krizan 1999). Evans (2012) claimed that best analytical

approaches are forward-looking, relevant to the company, free of bias, and current with the competitive landscape. For CI analyses Kruschwitz and Shockley (2010) recommended data visualisation, simulation and scenario development, analytics applied within business processes, and standardised reporting. Peyrot *et al.* (2002) claimed that the level of competition is positively related to CI use. This is especially the case for the Swiss telecom, as the market is highly competitive. This requires that the telecom firms intensively use their CI. O'Brien (2011) claimed that advanced analysis tools are needed to support the strategy process. In brief, all authors have set out ideas that cover a thorough evaluation of CI processes.

Some of these criteria arise when we consider findings in Section 5.3 (CI Management).

Criteria can also evaluate system needs of firms and their identified organisational structure—such criteria differ for developing and developed CI Processes (See CI Organisation, Section 5.4). Developing CI Processes can introduce new systems, and developed CI Processes require sophisticated systems (Wagner *et al.* 2006)—both require a systems engineering approach. (Britton *et al.* 1997). For developed CI Processes, this requires building CI units in departments to be close to the internal customers, while developing CI Processes require a central CI unit.

In Section 5.6, CI Content, criteria centre on the level of focus in analysis on immediate competitors, on technological change and on broader, potential market threats. Rouibah and Ould-ali (2002) pointed at the importance to interpret weak signals for decision-making and Neugarten (2006) differentiated between focused and peripheral visions (focused vision focusing in one direction and peripheral vision including the context). He identified it as optimal to take both views. These are considered as criteria that underpin the evaluation on degree of dynamic analyses being used (See Section 5.6, CI Content and CI Synthesis).

Section 5.6 offered insights into CI Synthesis. The criteria were centred on examining if CI outputs support management actions. Two aspects are discussed; a) Johnson and Lederer (2005) identified that communication frequency and mutual understanding between management and analysts supports performance; b) Rulke (2000) claimed that communication is important for organisational learning. In addition, McIntosh *et al.* (2011) emphasised analysts' exchange with management, which is taken forward in the analysis of findings; other criteria included the level of information exchange.

In Section 5.5, within CI Quality, there is a focus on effectiveness and sophistication of the CI Process and systems across firms. Requirements might include analytic capacity, analyst input for decisions. Maack (2001) proposed that scenario analyses can be a good basis to develop strategic plans and Herring (1999) noted the importance of *identifying indicators*. Thus, and the ability to generate relevant indicators from market analysis (i.e. scenario analysis) can be a key criteria of effectiveness. As scenario analysis reflects mutual support of management and CI it is also part of CI Synthesis.

Criteria for effectiveness in CI Activities from past studies are shown in Table 5.8 on page 148 and repeated below.

Table VII.1: Criteria for Effectiveness of the CI Process

CI Activity	Criteria from past studies	Author
<i>CI Management</i>	Process: planning, analytical approaches are forward-looking	BABOK 2009; Krizan 1999; Evans 2012
	Structured and ad hoc approaches to CI: data gathering and analysis are relevant, correct, and current, use appropriate CI tools	McIntosh <i>et al.</i> 2011
	CI analyses and communication: use techniques as data visualisation, simulation, scenario development, and reporting	Kruschwitz and Shockley 2010
	CI Organisation: develop systems, fit CI team structure according to development stage of CI Process	Wagner <i>et al.</i> 2006; Britton <i>et al.</i> 1997; Yap and Rashid 2011
<i>CI Analysis</i>	Data gathering: interpret relevant market patterns / indicators, follow a structured approach	Rouibah and Ould-ali 2002; Herring 1999
	Data analysis: take different views on topics (focused or holistic), perform relevant analyses for predictive, comparative, and priority setting perspectives	Neugarten 2006; Yap and Rashid 2011
<i>CI Quality</i>	CI Effectiveness: apply a flexible strategy process, effective way to communicate results, systems perceived as effective, processes perceived as effective	Hutzschenreuter and Kleindienst 2006; Johnson and Lederer 2005
	CI Sophistication: emphasise on communication, systems and processes perceived as sophisticated	Rulke 2000
<i>CI Synthesis</i>	CI analysts' support of management decision making: effectively support decision making with relevant analyses	Peyrot <i>et al.</i> 2002; O'Brien 2011
	Management support of CI: management extends organisational resources to CI, CI deals with relevant strategic issues	McIntosh <i>et al.</i> 2011
	CI Process supports the relevant market scenario analysis	Maack 2001; Herring 1999

VII.B Evaluation of Effectiveness of CI Activity for Telecom Firms

Appendices VII.1 to VII.4 summarise the overall effectiveness of CI Processes for each firm, based on some of the above criteria, as perceived by analysts with an additional researcher commentary.

Table VII.2: Evaluation of Effectiveness of CI Activity for Swisscom

Criteria	Swisscom	Own view
Process: planning, analytical approaches are forward-looking	No process plan, approaches through queries and ad hoc	Partly
Structured and ad hoc approaches to CI: data gathering and analysis are relevant, correct, and current, use appropriate CI tools	Various tools not evaluated, applied to queries	Yes
CI analyses and communication: use techniques as data visualisation, simulation, scenario development, and reporting	Flexible communication , query based, some analysis tools are applied, it depends on the analyst	Partly
CI Technology and Organisation: develop systems, fit CI team structure according to development stage of CI Process	CI team structure adopted to development stage , systems development reported	Yes
Data gathering: interpret relevant market patterns / indicators, follow a structured approach	Ad hoc approach for irregular signals, regular market scanning	Yes
Data analysis: take different views on topics (focused or holistic), perform relevant analyses for predictive, comparative, and priority setting perspectives	Relevant analysis techniques applied for all perspectives	Yes
CI Effectiveness: apply a flexible strategy process, effective way to communicate results, systems perceived as effective, processes perceived as effective	Flexible strategy process , no communication process popular tools, systems somewhat effective, process low effective	Partly
CI Sophistication: emphasise on communication, systems and processes perceived as sophisticated	No emphasis on communication, structures, system sophistication somewhat, process sophistication low	No
CI analysts' support of management decision making: effectively support decision making with relevant analyses	Several analysis techniques are used depending on the analyst, focus on results, priorities on key projects	Partly
Management support of CI: management extents organisational resources to CI, CI deals with relevant strategic issues	Management support, query based CI for strategic issues	Yes
CI Process supports the relevant market scenario analysis	Scenario analyses conducted at request	Yes

Table VII.3: Evaluation of Effectiveness of CI Activity for Sunrise

Criteria	Sunrise	Own view
Process: planning, analytical approaches are forward-looking	Ad hoc and structured approaches	Yes
Structured and ad hoc approaches to CI: data gathering and analysis are relevant, correct, and current, use appropriate CI tools	Regular competitor analyses, lacks evaluation and adaption from an array of appropriate analysis tools	Partly
CI analyses and communication: use techniques as data visualisation, simulation, scenario development, and reporting	Communication process with ad hoc elements , some analysis tools are applied	Partly
CI Technology and Organisation: develop systems, fit CI team structure according to development stage of CI Process	CI team adopted to development stage , systems should be developed, just MS office other than knowledge management	Partly
Data gathering: interpret relevant market patterns / indicators, follow a structured approach	Ad hoc approach for irregular signals, regular market scanning	Yes
Data analysis: take different views on topics (focused or holistic), perform relevant analyses for predictive, comparative, and priority setting perspectives	Some analysis techniques applied, but focus just on competitor	No
CI Effectiveness: apply a flexible strategy process, effective way to communicate results, systems perceived as effective, processes perceived as effective	Process with ad hoc elements, structured communication, effectiveness of systems N. A. as just MS office is used, medium effectiveness of processes	No
CI Sophistication: emphasise on communication, systems and processes perceived as sophisticated	Considered but no emphasis, structure, system sophistication somewhat, process sophistication medium	No
CI analysts' support of management decision making: effectively support decision making with relevant analyses	Some basic analysis techniques are used, regular brainstorm meetings	Partly
Management support of CI: management extents organisational resources to CI, CI deals with relevant strategic issues	Management support , strategy process mainly sticky with some ad hoc elements, CI could deals with more relevant issues	Partly
CI Process supports the relevant market scenario analysis	No scenario analyses reported, just secondary benchmarks	No

Table VII.4: Evaluation of Effectiveness of CI Activity for Orange

Criteria	Orange	Own view
Process: planning, analytical approaches are forward-looking	Structured approach with ad hoc elements	Yes
Structured and ad hoc approaches to CI: data gathering and analysis are relevant, correct, and current, use appropriate CI tools	Regular competitor analyses, lacks evaluation and adaption from an array of appropriate analysis tools	Partly
CI analyses and communication: use techniques as data visualisation, simulation, scenario development, and reporting	Communication process , some analysis tools are applied	Partly
CI Technology and Organisation: develop systems, fit CI team structure according to development stage of CI Process	CI team adopted to development stage , systems should be developed	Partly
Data gathering: interpret relevant market patterns / indicators, follow a structured approach	Ad hoc approach for irregular signals, regular market scanning	Yes
Data analysis: take different views on topics (focused or holistic), perform relevant analyses for predictive, comparative, and priority setting perspectives	Relevant analysis techniques applied from headquarter, lacks adoption to Swiss market	Yes
CI Effectiveness: apply a flexible strategy process, effective way to communicate results, systems perceived as effective, processes perceived as effective	Strategy process, no communication process popular tools, systems very little effective, process perceived as highly effective	Partly
CI Sophistication: emphasise on communication, systems and processes perceived as sophisticated	No emphasise on communication just structures, system sophistication somewhat, process sophistication medium	No
CI analysts' support of management decision making: effectively support decision making with relevant analyses	Analysis techniques are used, decision making process	Yes
Management support of CI: management extents organisational resources to CI, CI deals with relevant strategic issues	No management support, headquarter does many of the relevant CI activities	No
CI Process supports the relevant market scenario analysis	No own scenario analyses, not adapted from headquarter	No

Table VII.5: Evaluation of Effectiveness of CI Activity for Cablecom

Criteria	Cablecom	Own view
Process: planning, analytical approaches are forward-looking	Ad hoc and structured approaches	Yes
Structured and ad hoc approaches to CI: data gathering and analysis are relevant, correct, and current, use appropriate CI tools	Projects, financial reviews, lacks evaluation and adaption from an array of appropriate analysis tools	No
CI analyses and communication: use techniques as data visualisation, simulation, scenario development, and reporting	Process with focus just on competitors , analysis tools are applied	Partly
CI Technology and Organisation: develop systems, fit CI team structure according to development stage of CI Process	CI team adopted to development stage , systems development reported	Yes
Data gathering: interpret relevant market patterns / indicators, follow a structured approach	Ad hoc approach for irregular signals, regular market scanning	Yes
Data analysis: take different views on topics (focused or holistic), perform relevant analyses for predictive, comparative, and priority setting perspectives	Relevant analysis techniques applied	Yes
CI Effectiveness: apply a flexible strategy process, effective way to communicate results, systems perceived as effective, processes perceived as effective	Strategic function, communication process popular tools, systems somewhat to very much effective, process perceived as highly effective	Yes
CI Sophistication: emphasise on communication, systems and processes perceived as sophisticated	Emphasise on communication , process, system sophistication very little, process sophistication medium	Partly
CI analysts' support of management decision making: effectively support decision making with relevant analyses	Analysis techniques are used and evaluated, priority setting process	Yes
Management support of CI: management extents organisational resources to CI, CI deals with relevant strategic issues	Management support , query based approaches not reported, CI could focus more on issues relevant for the Swiss market	Partly
CI Process supports the relevant market scenario analysis	No market scenario analyses mentioned	No

Appendix VIII Perception of System Effectiveness and Sophistication

The following tables VIII.1, VIII.2, VIII.3, and VIII.4 show the respondents self-evaluation of systems effectiveness and sophistication.

Table VIII.1: Self-assessment of system effectiveness from checklist

Firm's analyst (q15)	Process Data	Analyse Information	Support Strategic Decision-Making
Swisscom strategic analyst	Somewhat	Somewhat	Somewhat
Swisscom department analyst	Somewhat	Very much	Very much
Swisscom strategic analyst	Somewhat	Very much	Very much
Sunrise strategic analyst	I do not know		
Orange strategic analyst	Somewhat	Very little	Not at all
Cablecom operational analyst	Somewhat	Somewhat	Somewhat
Cablecom strategic Analyst	Somewhat	Somewhat	Very much
Cablecom executive assistant	N. A.		

Table VIII.2: Summary of Perceived Effectiveness of CI Processes in Firms

Firm	Issue	Evidence of effectiveness of systems
Swisscom strategic analyst		Somewhat
Swisscom department and strategic analysts		Somewhat to very much
Sunrise strategic analyst		N. A.
Orange strategic analyst		Not at all to somewhat
Cablecom operational analyst		Somewhat
Cablecom strategic analyst		Somewhat to very much

Table VIII.3: Self-assessment of system sophistication from checklist

Firm's analyst (q14)	Process Data	Analyse Information	Support Strategic Decision-Making
Swisscom strategic analyst	Somewhat	Somewhat	Somewhat
Swisscom department analyst	Somewhat	Somewhat	Very little
Swisscom strategic analyst	Somewhat	Very little	Very little
Sunrise strategic analyst	Somewhat	Somewhat	Somewhat
Orange strategic analyst	Somewhat	Very little	Very little
Cablecom operational analyst	Somewhat	Very little	Very little
Cablecom strategic analyst	Very little	Very little	Very little
Cablecom executive assistant	N. A.		

Table VIII.4: Summary of Variation of System Sophistication across Firms

Firm analyst	System Sophistication	Adaptation of Systems
Swisscom strategic analyst	Somewhat	System application to store and retrieve data
Swisscom Department and strategic analyst	Very little to somewhat	Develop systems to meet users needs
Sunrise strategic analyst	Somewhat	Emphasis on Microsoft office
Orange strategic analyst	Very little to somewhat	Emphasis on Microsoft office
Cablecom operational analyst	Very little to somewhat	Emphasis on Excel
Cablecom strategic analyst	Very little	Develop adapt HQ analyses

Table VIII.5 offers a summary of Perceived Effectiveness of CI Processes in Firms

Table VIII.5: Summary of Perceived Effectiveness of CI Processes in Firms

Firm / Issue	Strategy process	Communication with users	Choice of tools for decision preparation	Commentary
Swisscom 2010 strategic analyst	Repetitive predefined process	Popular tools, mailing list, give one view, service development	Ad hoc, few tools	The strategy process has developed to a query-based approach to capture actual market topics. There are enhanced communication tools, but communication is not structured. All tasks are focused on queries for strategy, which indicates rather high effectiveness.
Swisscom 2010 department and strategic analysts	Query-based with recommendations from sophisticated analyses, can be 4 times an year to answer relevant questions	Enhanced tools, to whom it concerns, presentation, individual meetings, portals with tailored access	Ad hoc, choice of tools depending on the query	
Sunrise 2010 strategic analyst	Predefined starting every year with analyses and decisions	Popular tools, distribution lists information to whom it concerns	Structure, strategy workshop with brainstorming	The strategy process is merely sticky, but structures for decision-preparation and communication indicate intermediate effectiveness.
Orange 2010 strategic analyst	Present output to management from customer and competitors, frequency depends on information	Popular tools, regularly report to highest level of company, for product launches communicate ad hoc	Structure and ad hoc tools, project adoption process, quick analyses for urgent topics	Ad hoc involvement in strategy process, action and organisation for urgent topics and processes for projects indicate merely intermediate effectiveness.
Cablecom 2010 operational analyst	Send competitive update reports as Excel spread sheets	Enhanced tools, no presentation, budget process to quarterly competitor update	Interactively develop part of strategy through intranet	Operationally competitive update is the only involvement in strategy, but the strategic function of the strategic analyst focuses on adapting corporate strategy to the Swiss market - a strategy process so to speak, which makes it highly effective, as it is an on-going task. It does not appear sticky, even though structured communication and evaluated tools (SFOT) are applied.
Cablecom 2010 strategic analyst	Strategic function, adapts corporate directions to local market	Popular tools, project process with memorandum and decisions, program of change, portals to share ad hoc information and customer care	Evaluated tool SFOT, formalised meetings	

Figure VIII.1: CI Quality: Characteristics of Effectiveness and Sophistication

Key elements that show Effectiveness	Key elements that show Sophistication
Analyst Involvement in Strategy Analysts are part of the strategy department Strategic and operational roles	Emphasise Communication Structured and ac hoc ways to communicate for specific purposes
Multiple Communication Channels Communication with internal customers Emphasis on communication with management	Emphasise Networks Deliberate feedback shows that analysts and internal customers are both part of a network
Internal Alignment of Systems Information systems aligned with analysts and internal customers needs	System capabilities Systems process quantitative and qualitative data types and are perceived as sophisticated
Organisational Process shaping Effectiveness	Organisational Process shaping Sophistication
Approach to Analysis Predefined firm-internal frameworks Ad hoc	Strategy Process Flexible, query-based Processed, structured, sticky
Static, Dynamic and Priority Setting Analyses Analyses identify market and potential development Priorities adapted to main relevant issues/ projects	CI team and Management Management Supports CI team CI impacts strategy
Market Focus Awareness of potential threats: New competitors and technologies	Market Reaction Management is prepared to react on threats CI team analyses threats (competitors, technologies)

Appendix IX Evidence of Explicit and Implicit Approaches at Firm level

Overall the pattern emerged that headquarter centred firms, such as Orange and Cablecom appeared to use more explicit CI approaches, with predefined companywide routines and systems. The firm-centred approach from Swisscom was characterised by their implicit approach, with queries, flexible ad hoc approaches and adaptation of systems and structures to analyst needs. Sunrise with its developing CI Process applied a more explicit approach but already showed implicit characteristics as they seemed to focus more on communication than on systems and processes. A summary of these patterns is shown in **Table IX.1**.

Table IX.1: Explicit and Implicit CI Approaches linked to the CI Activities

CI Activity	Management	Quality	Organisation	Content	Synthesis
Explicit approach	<ul style="list-style-type: none"> • CI process is developing • Emphasis on documentation 	<ul style="list-style-type: none"> • Emphasis on communication structures • Structured feedback 	<ul style="list-style-type: none"> • Information from portals • Central CI team • Headquarter centred 	<ul style="list-style-type: none"> • Companywide analysis toolbox 	<ul style="list-style-type: none"> • Predefined strategy process
Examples	<ul style="list-style-type: none"> • “[In 2008] <i>we centralised</i> ...[CI]” (Analyst 4, Sunrise, date of interview 01/10/2010) • “<i>We have some operations to do for example reports.</i>” (Analyst 5, Orange, date of interview 20/10/2010) • “<i>A report, which all project leaders have to provide directly to the senior management, and to address their issues</i>” (Analyst 8, Cablecom, date of interview 29/12/2010) 	<ul style="list-style-type: none"> • “<i>The main communication channel is through formalised meetings.</i>” (Analyst 7, Cablecom, date of interview 29/12/2010) • “<i>We always invite the audience to provide feedback to us.</i>” (Analyst 4, Sunrise, date of interview 01/10/2010) 	<ul style="list-style-type: none"> • “<i>A group level from France Telecom. There we have a big portal with lots of information for all the trends.</i>” (Analyst 5, Orange, date of interview 20/10/2010) • “[CI] <i>is more or less centralised.</i>” (Analyst 4, Sunrise, date of interview 01/10/2010) 	<ul style="list-style-type: none"> • <i>We also have frameworks</i> [levers], which we have defined internally, which cannot be revealed. (Analyst 5, Orange, date of interview 20/10/2010) • “<i>Our analytical approach is shared to all levels.</i>” (Analyst 8, Cablecom, date of interview 29/12/2010) 	<ul style="list-style-type: none"> • “<i>We have a defined [annual] strategy process.</i>” (Analyst 4, Sunrise, date of interview 01/10/2010) • “<i>A decision-making process. ... You have three options we recommend one.</i>” (Analyst 5, Orange, date of interview 20/10/2010) • “<i>The strategy process ... needs to align for competitors on the local market</i>” (Analyst 7, Cablecom, date of interview 29/12/2010)
Commentary	Analysts working on CI processes in an explicit way emphasised CI development and documentation of reports	The explicit approach showed formalised meetings and structured communication. Feedback was given mainly on demand.	Orange and Cablecom accessed portals for information from their headquarters. Sunrise and Orange reported central CI teams	The explicit way to do analyses was to share one approach i.e. a framework throughout the company	The explicit approach emphasised repetitive and predefined patterns

CI Activity	Management	Quality	Organisation	Content	Synthesis
Implicit approach	<ul style="list-style-type: none"> • CI process is developed • Emphasis to communicate results 	<ul style="list-style-type: none"> • Networks, ad hoc meetings • Learn from feedback 	<ul style="list-style-type: none"> • Tailored systems • De-central CI teams • Firm centred 	<ul style="list-style-type: none"> • Experience, tools were chosen individually • used ad hoc 	<ul style="list-style-type: none"> • Strategy process is flexible, query-based
Examples	<ul style="list-style-type: none"> • “<i>Ad hoc assignments answering questions and it can go that far that they ... give recommendations how to act.</i>” (Analyst 2, Swisscom, date of interview 14/04/2010) • “... <i>Questions concerning how the situation in the Swiss market will develop.</i>” (Analyst 3, Swisscom, date of interview 14/04/2010) 	<ul style="list-style-type: none"> • “<i>Employees giving us feedbacks whenever they hear or see something.</i>” (Analyst 3, Swisscom, date of interview 14/04/2010) • “<i>If you communicate something on Etouch you [usually] get some feedback.</i>” (Analyst 6, Cablecom, date of interview 10/11/2010) 	<ul style="list-style-type: none"> • “<i>Competitor Radar Portal has been developed internally... It is very functional.</i>” (Analyst 2, Swisscom, date of interview 14/04/2010) 	<ul style="list-style-type: none"> • “<i>I feel from my experience how should I analyse.</i>” (Analyst 1, Swisscom, date of interview 12/02/2010) • “<i>What I surely can say is that there is not one tool or model, which always has to be applied.</i>” (Analyst 2, Swisscom, date of interview 14/04/2010) 	<ul style="list-style-type: none"> • “<i>Today this [strategy process] is merely done in a query-based form.</i>” (Analyst 3, Swisscom, date of interview 14/04/2010)
Commentary	Developed CI processes showed emphasis on communication of CI issues and flexibility in identifying CI issues	Implicit approaches are characterised by ad hoc contacts with employees and emphasise learning	Firm centred CI processes - as of Swisscom and Sunrise have to develop and adapt their own systems and portals.	Analysis choice is based on which method is most appropriate from the analysts viewpoint	The flexible strategy process shows tailored CI analyses of actual market changes
Description	Orange and Cablecom emphasised documentation. Cablecom had developed CI process. Sunrise focused on CI development, and Swisscom emphasised to communicate CI.	Sunrise, Orange and Cablecom strategic reported formalised ways, while Swisscom and Cablecom operational reported ad hoc ways for feedback.	Orange and Cablecom operated headquarter centred, while Swisscom and Sunrise operate firm centred.	While Sunrise, Orange and Cablecom reported explicit analysis approaches, Swisscom reported implicit ways.	Sunrise, Orange and Cablecom reported strategy processes, while Swisscom reported a query-based approach.

Appendix X Quantitative Data

Appendix X shows the data that were used for the scenario analysis of Swisscom in Chapter 6.

Table X.1: Data Number of “Patents”, Number of “New Entrants”, “Consumer price” in % and “Profit of Swisscom” in M. CHF

Year	V1 Profit of Swisscom ^a	V2 New Entrants ^b	V3 Patents ^c	V4 Consumer price index ^d
1970	98	13272	17575	0.669
1971	32	14689	16079	0.712
1972	158	14671	14921	0.760
1973	123	14473	13680	0.826
1974	0	14266	12970	0.907
1975	206	14065	13700	0.968
1976	221	14290	12300	0.985
1977	373	14613	22555	0.997
1978	633	14385	704	1.008
1979	645	15938	6614	1.044
1980	682	16521	6244	1.086
1981	641	16373	8289	1.157
1982	551	16423	9627	1.222
1983	637	18171	11752	1.258
1984	848	18910	13977	1.295
1985	906	19788	14543	1.339
1986	922	20524	15267	1.239
1987	916	21650	13403	1.369
1988	844	23319	14993	1.395
1989	744	24914	16034	1.439
1990	783	24733	16155	1.516
1991	530	23929	16810	1.605
1992	765	22925	17967	1.670
1993	767	22320	20634	1.725
1994	1055	24263	22306	1.740
1995	1426	26349	20346	1.771
1996	764	27071	18778	1.785
1997	-415	29693	18082	1.795
1998	1528	31198	16253	1.795
1999	2390	30889	15434	1.809
2000	3170	31872	12258	1.838
2001	5293	31555	15638	1.856
2002	1127	30964	21852	1.868
2003	1911	32057	29799	1.880
2004	1948	34443	31703	1.895
2005	2346	33702	30337	1.917

2006	1904	34148	37266	1.937
2007	2071	36396	34130	1.951
2008	1751	36861	39271	1.999
2009	1925	35365	36033	1.989
(2010)	(1706)	(37695)	(40669)	(2.003)

Data sources

V1 = Profit of Swisscom in Mio CHF: 1997 to 2009: Swisscom (2010c), 1970 to 1996: Swiss Postal Archives with friendly support from Burry, M.

V2 = Number of New Entrants: Creditreform (2010) with friendly support from Creditreform Federer, C.

V3 = Number of Patents: Patents (2010) with friendly support from Patent Office Balmer, S.

V4 = Consumer price index in %: Swiss federal statistical office (Consumer price index, 2010).

Smoothing is computed by using the following formula:

$$Profit_{\alpha 1} = Profit_1$$

$$Profit_{\alpha n} = Profit_n \cdot \alpha + Profit_{\alpha n-1} \cdot (1 - \alpha)$$

α = Smoothing factor

N = time (years)

Table X.2: Smoothed MA variables

Year	V1 Net Profit (MA = 2, $\alpha = 0.3$)	V2 New Entrants (MA = 2, $\alpha = 0.3$)	V3 Patents (MA = 2, no smoothing)
1971	111	14330	16164
1972	91	14438	14900
1973	126	14508	13813
1974	133	14497	13330
1975	93	14428	13168
1976	129	14319	15214
1977	158	14310	14529
1978	222	14401	7644
1979	344	14396	5044
1980	426	14859	6848
1981	487	15357	8112
1982	507	15662	9824
1983	490	15890	11777
1984	495	16575	13562
1985	543	17275	14583
1986	583	18029	14620
1987	631	18778	14267
1988	643	19639	14856
1989	631	20743	15804
1990	597	21994	16289
1991	573	22816	16936
1992	500	23150	18345
1993	487	23082	20385
1994	475	22854	21398
1995	514	23276	20444
1996	601	24198	18996
1997	546	25060	17799
1998	313	26450	16506
1999	475	27874	14845
2000	729	28779	13897
2001	1027	29707	16347
2002	1575	30261	22285
2003	1283	30472	28288
2004	1203	30948	30886
2005	1151	31996	32411
2006	1173	32508	34750
2007	1116	33000	36199
2008	1099	34019	37176