



The organisation of Corporate Foresight: A multiple case study in the telecommunication industry



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ABSTRACT

The present paper focuses on the organisation of Corporate Foresight (CF): **how the companies design their organisation to anticipate future trends and detect weak signals.**

The research focuses on a multiple case-study in the telecommunication industry. **The paper highlights the organisational variables that characterise a CF organisation (organisational definition, specialisation and mechanisms of internal cohesion) and relates them to CF performance measures (effectiveness and efficiency).**

For increasing CF performance, companies need to define a peculiar system for foresight, more “structural” or more “cultural”, to specialise for foresight, to build a control system for procedures and to model internal and external relationships.

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1. The organisation for future-oriented strategy and innovation

Corporate Foresight (CF) is the process used by companies to identify weak signals and information from the periphery, anticipate emerging markets and trends and formulate corporate strategies and innovation policies to prepare for an uncertain future [1–5]. Very recently, scholars have begun to interpret foresight also from the point of view of dynamic capabilities, and define it as a capability for organisational future orientation [6]. CF helps companies to try to understand the complex forces that drive change, to accordingly support the decision-making process and strategy and to nurture R&D for innovation [7–13]. The relevance of foresight is confirmed also by the literature on innovation management and strategy management that focuses on the problem of capacity building in discontinuous conditions. Here, some scholars [14,15] sustain that the secret for the success of a company is based on future orientation, paired with strong foresight capability, and based on flexible and adaptable systems.

Nevertheless there is still a lack of real integration of the CF process into the company's organisational structure [16–20]. In fact, while the majority of corporate foresight literature focuses its attention on methodology and techniques, there are few contributions (e.g. [21]) that consider the organisation of CF among the important elements that should drive the design of a CF system. However, they do not investigate systematically and in detail how the organisation is structured and whether there are contextual elements, or elements connected to the specific organisational activity, that influence all the system's elements and the CF performance. This is in sharp contrast with the literature that acknowledges the importance of designing and structuring a particular organisation so that foresight capabilities are increased [6,22,23].

This paper aims to take a step further in our understanding of CF systems in an attempt to fill the aforementioned gap in the existing literature. Specifically, it focuses its attention on the organisation of Corporate Foresight: **its purpose is to investigate how the companies organise the implementation of CF, and if and how the CF organisation influences CF performance.**

Specifically, the paper investigates four organisational dimensions: organisational structure, coordination mechanisms, decision-making processes and control systems. It defines the

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dimensions of CF efficiency and CF effectiveness based on strategic management and knowledge management literature. The research is based on a pilot case study plus a multiple case study of seven companies in the telecommunication industry.

The paper is structured as follows. In Section 2 literature on Corporate Foresight is reviewed, with the purpose of highlighting the gaps and developing a research framework comprising the constituting elements of a CF system that is able to support the subsequent empirical analysis. In Section 3 the research methodology is discussed. Section 4 reports the findings of the empirical investigation and discusses the major achievements of the paper. Finally, Section 5 summarises the paper's achievements, discusses their value for researchers and managers and outlines some possible directions for future research.

2. Designing the organisation of Corporate Foresight: a literature review

Foresight is defined by the Cambridge Dictionary as “the ability to judge correctly what is going to happen in the future and plan your actions based on this knowledge”. It is defined in practice as a “systematic, participatory, future-intelligence-gathering and medium-to-long-term vision-building process aimed at present-day decisions and mobilising joint actions” [24]. Corporate Foresight is “the art of the long view” [25] in companies: it concerns the long-term analysis of business environments, markets and new technologies, and their implications for corporate strategies and innovation [26].

Foresight helps companies to develop a vision to try to understand the complex forces that drive the change, to accordingly support the decision-making process and manage strategy and R&D. Foresight literature still focuses on methods and/or processes: scholars discussed how to improve single methods, how to build a rich toolbox for foresight, the phases of the foresight process, etc. but missed the point that foresight is not about looking a long way ahead, but the capability to organise for uncertainty. The CF literature recognises this main point (the foresight capability), but still lacks works that contribute to the operationalisation of foresight capability (i.e. how can a company concretely build its future management system to contribute to its innovation capacity?).

2.1. Corporate foresight and organisation

A corporate system can be conceived as a set of practices related to strategy, organisation, management and technology [27]. The choices are influenced by external and internal factors and the system impacts on performance. This general framework has been adapted for the specificity of foresight. These constitutive elements are closely interconnected, i.e. the design and structure of each of these elements are influenced by the way in which the others are structured. Despite the fact that the focus of the research is CF organisation, in order to define an overview of the CF activities, the other sections (i.e. strategy, management and technology) have been considered and analysed.

The organisation of Corporate Foresight refers to location, size (number of people involved, dimension, resources, budget,

etc.), mechanisms (control systems, procedures, etc.) of foresight activities that take place within a company [28].

Taking from the literature on organisation [29,30], we conceive the general internal organisation as a set of four main basic elements, namely: (i) structure (ii) coordination (iii) decision-making processes and (iv) control systems. See Table 1 for their definition. During the research, these four elements have been investigated for the specificity of CF organisation.

2.1.1. Structure

Structure is subdivided into organisational unit/function definition and organisational unit/function dimension [31]. The *definition* refers to the basis through which different positions are grouped in organisational units, for example budget, positions, and functions. The *dimension* is defined as the number of positions grouped in the same unit, for example number of people, number of units connected.

CF literature focused mainly on organisational unit/function definition. In order to select an appropriate organisational structure, Gassmann and Gaso [32] suggest four determinants based on type and quantity of knowledge exchanged.¹ Also Brockhoff [33] suggests a differentiation based on the type of foresight activity.

Ashton and Stacey [34] add the dependence on product strategy (diversified product mix vs. not-diversified) and on the attitude toward technology threats (aggressive, concerned or complacent). In line with this, Daheim and Uerz [21] say that the culture and the management style explain the differences among four organisational forms for foresight units: the collecting post (collects information, based on individuals,); the observatory (specialised tasks, well addressed internally); the think tank (many tasks, internal and external network) and the outsourcer (experts in method, external network).

Sanz Menéndez et al. [35] specify that national context (relative levels of income or other variables) and identifiable diffusion process (geographical or cultural) influence the emergence of foresight as a local practice. Keenan and Popper [36] write that concerning national foresight the differences in context (in terms of political, socio-economic, and cultural conditions) affect only the style but not the participation levels and the identity of target groups.

Some works describe the factors that the organisational unit/function definition influences. Lackman et al. [37] suggest that the organisational location can have an influence on reporting relationships, budgets and the type of projects undertaken.

As regards organisational unit/function dimension, Daheim and Uerz [21] define four organisational forms where the collecting post is the smallest form of foresight unit in the company and Gassmann and Gaso [32] specify that as the degree of knowledge application is more systematic, a larger dimension is needed. Lichtenhaler [38] identifies dimension as a fundamental variable that influences the organisational structure of foresight, in particular the size of corporate R&D units, of corporate R&D budgets and of international R&D units.

¹ Type of knowledge acquisition (formal vs. informal), knowledge assessment (expert technician vs. information expert), type of knowledge transformation (competence acquisition vs. competence enhancement) and degree of knowledge application (sporadic vs. systematic).

Table 1
Research protocol.

Area	Variable	Characteristic	Definition	Example	References
CF organisation	Structure	Organisational unit/ function definition	Definition is the basis through which different positions are grouped in organisational units	Complexity of articulation in terms of budget, positions, missions, functions, units connected, adaptation to the general structure...	Ashton and Stacey [34] Brockhoff [33] Daheim and Uerz [21] Gassmann and Gaso [32] Keenan and Popper [36] Lackman et al. [37] Rohrbeck [6] Ruff [26] Sanz Menéndez et al. [35]
		Organisational unit/ function dimension	Dimension refers to the number of positions grouped in the same unit	Number of people, number of units connected, standardisation...	Daheim and Uerz [21] Gassmann and Gaso [32] Lichtenthaler [38]
	Coordination	Specialisation	Specialisation refers to subdivision of labour	Typology of jobs and numbers, institutionalisation of foresight, specific skills of foresighters, specific methods used,...	Alsán [45] Bürgel et al. [102] Hayward [40] Keenan and Popper [36] Ratcliffe [15] Volkery and Ribeiro [39] Ughetto [41] Keenan and Popper [36]
		Training	Refers to standardisation of knowledge through programmes of education	Competences and background, training of the personnel for foresight,...	
	Decision processes	Vertical decentralisation	Degree of delegation of decisional power	Linkages with strategic decision making at corporate and business levels	Ashton et al. [43] Borjesson et al. (2006) Brockhoff [33] Lichtenthaler [38] Reger [19] Van der Duin and den Hartigh [12]
		Horizontal decentralisation	Degree of delegation of decisional power	Linkages with other functions and informal units	Ashton and Stacey [34] Van der Duin and den Hartigh [12] Lichtenthaler [38] Brockhoff [33] Horton [44]
	Control systems	Procedures formalisation and process	Standardisation of operations through procedures, guidelines, etc.	Procedures, guidelines, formal methods, rigorous data,...	Rollwagen et al. [42] Horton [44]
		Internal cohesion mechanisms	Tools for reciprocal adapting of organisational units	Task forces, internal and external networks	Alsán [45] Ughetto [41] Ashton et al. [43] Lackman et al. [37] Keenan and Popper [36] Rollwagen et al. [42]
CF performance	Efficiency Effectiveness	See Tables 3 and 4			

2.1.2. Coordination

Coordination is subdivided into specialisation and training [31]. Specialisation refers to subdivision of labour, for example typology of jobs. Training refers to standardisation of knowledge through education programmes, for example competences and background.

Coordination is for some authors affected by contextual conditions [39]² and for some others not [36]. Organisational challenges for CF are connected to commitment, communication and finding champions of foresight [15]. System thinking and self-organisation can help foresight specialisation [40]. Participation of stakeholders with different backgrounds,

dynamics of overlapping opinions, emergence of hybrid organisations and exchange of formal roles are some of the elements characterizing a foresight coordination [41].

Training can help coordination, because tool transfer and learning reduce the influence of contextual conditions [42].

2.1.3. Decision processes

Decision processes are subdivided into vertical decentralisation and horizontal decentralisation. Vertical decentralisation is the degree of delegation of decisional power, for example linkages with strategic decision making at corporate and business levels. Horizontal decentralisation refers to the degree of delegation of decisional power, but horizontally. For example, the linkages with other functions and informal units De Toni and Nonino [99].

The importance of the commitment of top management is stressed by different authors. The most successful foresight programmes are those which are able to influence high levels of the organisation because they give credibility and help

² They found different factors influencing the success of future methodologies, such as political factors (organisations willingness to include a long term view), skills of those carrying out the foresight exercise, level of involvement of the audience, institutional context of the audience, selection of right methodology, and resources for the project.

ensure the commitment of users to the programme [43]. The latest generation of foresight is developed and integrated within company strategic planning, with networks comprising a fundamental component [19]. Brockhoff [33] suggests a differentiation of centralisation based on the type of foresight activity (decentralised approach for the collection and dissemination of information, but a centralised approach for organisation, evaluation and transformation of the collected information).

On the other side, vertical centralisation influences foresight. Futures researchers should balance the way they conduct futures research with the way innovation and strategy processes are organised and carried out. For example, in an organisation with a hierarchical approach to building a strategy, a “democratic” and interactive approach to futures research will probably not be appreciated [12].

As regards horizontal decentralisation, foresight activities are strongly based on networking, external experts and networks [34]. These networks include for example university–industry collaboration, co-development with customers, or joint ventures. Outsiders can add value as catalysts and perhaps as temporary resources [44].

Lichtenthaler [38] describes the last generation of technology intelligence characterised by a high level of decentralisation:

- global network of foresight units at corporate and business unit level, numerous decentralised loosely coupled units at various decision-making levels, which can be strongly coupled;
- motivation through decentralisation of decision making;
- parallel utilisation of structural, hybrid and informal forms of coordination.

2.1.4. Control systems

Control systems are subdivided into formalisation of procedures and processes and internal cohesion mechanisms. The formalisation of procedures and processes is the standardisation of operations through procedures, guidelines etc. Internal cohesion mechanisms are tools for reciprocal adaption of organisational units, for example task forces.

Authors state that foresight is connected to creativity [44] and that the formalisation of organisational procedures and processes works if they are integrated into the organisation's system [42].

Internal cohesion mechanisms are very important to guide foresight projects. In fact, at the working level, successful foresight also accounts for several features that make the daily functions work: gatekeepers, reward systems and information exchange [43]. Also sharing of experiences is very important to increase the learning experience [45]. Control systems (influence on reporting relationships, budgets and the type of projects) influence by organisational location [37].

2.2. Corporate foresight process performance

Literature [46,47] agrees on the inherent difficulty of evaluating foresight studies. However, it also agrees on the necessity of it [48].

Literature presents discussions on the theme, especially from the policy foresight point of view. Some recent works

build interesting frameworks for foresight evaluation, as for example the works of Barrè and Keenan [49], Piirainen et al. [50] and Johnston [51].

Van der Duin and Van der Steen [52] state that evaluation of futures research (foresight) consists of three elements: *quality*, *success* and *impact* of a study. Futures research ought to be methodologically and professionally sound should be accurate to a certain extent and should have a degree of impact on strategic decision-making and policy-making. However, in the case of futures studies, the one does not automatically lead to the other. *Quality of method does not ensure success, just as quality and success do not guarantee impact* [53].

The classic criteria of evaluation are [53]:

- *Efficiency of implementation*: process evaluation, focused on managerial and logistical issues.
- *Effectiveness, impact and appropriateness*: what foresight has produced in terms of outputs and outcomes.

2.2.1. Corporate foresight process performance – efficiency

Efficiency is defined as the use of resources and rapidity of the CF process for obtaining foresight results. It deals with the quality of execution, data quality, suitability of the methods and diligence of reporting.

A question can be formulated as: “Is this the best way of doing this (i.e. with less costs and with less time) to achieve valid conclusions reliably and with a sustainable impact?” A further consideration in business context is “What is the return on our investment?”. Efficiency is then translated into time, costs and resource measures.

Time is a very important issue because foresight study almost always takes more time than policy-makers and decision-makers thought it would. It leads to time-pressure at the end of a project, which reduces the impact of the study [54]. Foresight should be coherent and compatible with the analysis and the timeframe set [55].

Georghiou and Keenan [56] specify the issue of cost of the foresight activities, also related to the costs generated for policy or strategy by the decisions taken in the reports.

Tailoring the study to the specific context of the organisation is related to efficiency, therefore coherence of resources (in terms of methods used and people involved) is very important [57].

Foresight ought to be methodologically and professionally sound, it should to a certain extent be accurate [58]. In relation to this, an important issue is trust. Selin [59] lists three conditions: the participants must trust each other enough to share their expert knowledge, the method must meet the methodological requirements of the participants and the delivery has to be trust inspiring.

Table 2 summarises the main works on CF efficiency.

2.2.2. Corporate foresight process performance – effectiveness

The measures of effectiveness are related to goal achievement and satisfaction with the product of foresight and the quality of execution, in essence to answering the questions “Did we get what we thought we wanted?” and “Did we get what we wanted effectively?” [60].

Effectiveness refers to reaching the results of the corporate foresight process. They can be subdivided into short-mid

Table 2

Corporate foresight process performance – efficiency.

Measure		Method	Author
Time	Foresights should be plausible, logical and internally consistent, coherent and compatible with the analysis and the timeframe set. Time to market reduction. Are the trends and conceptual model on which the foresight builds on compatible with the chosen timeframe?	<ul style="list-style-type: none"> • Comparison of real time implemented and timeframe set • Comparison of real time implemented with time of other foresight projects 	Schoemaker [54]; McKay et al. [55]
Costs	Cost of the study; Influence on government department expenditure; science base expenditure	<ul style="list-style-type: none"> • Evaluation of resources feasibility and fit with assumptions • Comparison with other studies 	Georgiou and Keenan [56]
Coherence (of methods and people)	Suitable method according to the foresight need, the level of analysis and available resources. Appropriateness and efficiency of methods used, for example: Should a Delphi have been used? Were scenario workshops properly facilitated? Do the foresights combine the effect of compatible trends and drivers; Were the right people involved in an exercise? Are major stakeholders positioned in places that are realistic?	<ul style="list-style-type: none"> • Evaluation of resources feasibility and fit with assumptions • Comparison with other studies 	Bishop et al. [58] Bradfield et al. [103] Georgiou and Keenan [53]; McKay et al. [55]; Piirainen et al. [50]; Schoemaker [54] Rohrbeck [57]
Data quality and rigour	Rigorous use of methodology, documentation and transparent use of data Accuracy of prediction and diffusion of results (to non-experts)	<ul style="list-style-type: none"> • Evaluation of resources feasibility and fit with assumptions • Comparison with other studies • Documentation of the design choices and execution • Triangulation of data • Evaluation of sources 	Bishop et al. [58]; Van der Duin and Van der Steen [52]; Schartinger and Weber [104]
Support and trust, ethics	Did expert panels (if used) receive adequate support? Ethics of foresight study	<ul style="list-style-type: none"> • Support to participants • acceptability of the assignment, research conduct and sincerity and openness of the actions 	Georgiou and Keenan [53]; Selin [59]; Bell [105]; Piirainen et al. [50]; Reinig [8]

term impacts and long-term impacts. The results of corporate foresight will be used by strategic decision makers and innovation managers. Examples of results are identification of trends, identification of early warnings, identification of weak signals, development of “peripheral vision”, increasing of the capacity of perception of the environment... [61].

One first measure related to effectiveness is the knowledge impact [62]. That is, generating consolidated findings concerning the dynamics of change, future challenges and options.

Users value the shared learning experience of a futures study. Impacts of the CF process are the collective learning through an open exchange of experiences; accumulation of experience in using foresight tools and thinking actively about the future [49].

Another objective of foresight is capacity building (for example, through technical/personal skill development, but also including institutional capacity to address certain issues) [51].

People and networks are another important aspect of the effectiveness of the foresight process. Foresight processes rely on networks and on stakeholders and in the long term should aim to develop a foresight culture. Evaluation processes need to be interactive and connective; this refers to the interaction between the supply and the demand side of futures studies. This is important, because it may increase the overall trust and credibility of futures-research by potential ‘users’ [63,52].

Often, lack of success is connected with initial and subsequent positioning, i.e. the distance of foresight process from strategy and innovation. The degree of impact on strategic decision making and policy-making is therefore important.

Foresight will only be used if it is possible to connect findings to the relevant strategic or innovation context. Therefore, the connection with strategy, innovation and research and marketing is very important [61].

Table 3 summarises the main works on CF effectiveness.

3. Research strategy

3.1. Research gaps and research questions

Different strands of literature (futures studies, innovation management, strategic management, R&D management...) contributed to the problem of how to manage to prepare for an uncertain (and discontinuous) future [15,64–67]. The literature shows several recommendations, but knowledge remains incomplete regarding a systemic and integrated framework for companies’ future-oriented management (especially from an organisational point of view) and the impact of CF organisation on CF performance. The main gaps that can be highlighted (also from Tables 2 and 3) are the lacks of:

- a theoretical and empirical analysis of the different ways in which companies articulate the organisational structure for CF: the lack of detailed suggestions on how to design and implement the organisational variables in terms of structure and mechanisms to support a future-oriented strategy;
- a hypothesis on the links of CF organisation with CF performance.

Table 4 summarises the main works on CF organisation and performance and highlights the gap.

Table 3

Corporate foresight process performance — effectiveness.

Measure		Method	Author
Knowledge	Knowledge creation, diffusion and absorption	Reports disseminated Comparisons between historical/present knowledge Evaluation of feasibility of the results Consistency of the results internally and with the assumptions Evaluation of robustness of the results for change in the assumptions or design flaws	Amanatidou and Guy [62]; Amsteus [106]; ESRC [107]; Havas et al. [108]; Ogilvy [109]; De Toni et al. [100]; Piirainen et al. [50]
Learning	Collective learning through an open exchange of experiences; accumulation of experience in using foresight tools and thinking actively about the future <i>More time and energy should be invested in relating to the persons that will have to use the studies.</i> The report has value, but it is the process that leads to it that really matters. Users value the <i>shared learning experience</i> of a futures study. Propelling societal learning processes	Testing of the modelling/foresight assumptions; Walk-through of the model/foresight and assumptions; Comparisons with other models/foresights	Barre and Keenan [49]; Rijkens-Klomp [63]; Yuan et al. [110]
Capacity building	Awareness raising; Gain insights into complex interactions and emerging drivers of change; Enabling greater capacity to address uncertainty, facilitate better understanding of potential disruptive change; Detect and analyse weak signals to 'foresee' changes in the future; Produce future oriented material for the system to use; Facilitate thinking out of the box, challenge mindsets; Enhancement of the future orientation and capacity of policy-decision makers and institutions	Building early warning systems Enhancing intelligence systems and stimulating the exchange of information Increase in foresight awareness, use of foresight in planning and decision-making and consideration of issues with a long-term time horizon.	Barre and Keenan [49]; Da Costa et al. [111]; ESRC (2009); Johnston [51]; Yuan et al. [110]
Social capital and people	Interest from the general public; Social capital and networking; Form new networks and provoke new ones, creation of new networks and clusters; Extent of awareness building and networking; Establishment of networks among the industrial and academic participants; Formation of new industry-science networks Support the empowerment of system actors, build trust between system actors; Emergence of a foresight culture;	Number of "new networks" formed novelty, size, significance and durability of networks Changing existing institutions and building partnerships among actors Evidence of higher level of comprehension across the community about approaches to address uncertainty and major change.	Amanatidou and Guy [62]; Barre and Keenan [49]; Da Costa et al. [111]; Georghiou and Keenan [56]; Nonino [101]; Yuan et al. [110]
Connection with strategy, with innovation and research and with marketing	Interpreting. The insights of foresight and merging those results with perspectives on strategic positioning. Connection of foresight activities with strategy For budget-owners the value of corporate foresight pay out on the longer term, or even in different areas of the organisation. Take into account business-models and consumer behaviour. For budget-owners the value of corporate foresight pays out on the longer term, or even in different areas of the organisation.	Extent of participation and stakeholder engagement in the processes Participation of internal stakeholders Emergence of a foresight culture Increased application of foresight to planning and management, greater competence in managing uncertainty, strategy being formulated over longer time-horizons Evolution of strategies to cope with or escape from the consequences source of inspiration for actors programmes that clearly draw on the concepts, findings and data of foresight, adoption of agendas and terminology arising from foresight, establishment of a horizon scanning capacity Innovations implemented Shifting of research priorities in accord with foresight findings Start of new innovation projects and programmes Increased collaboration in addressing major future issues, structures to support future-oriented research Customers and business units satisfaction	Barre and Keenan [49]; Da Costa et al. [111]; Georghiou and Keenan [56]; Rohrbeck [57] Amanatidou and Guy [62]; Battistella and De Toni [61]; Bürgel et al. [16]; Calof and Smith [112]; Cagnin and Johnston [113]; Da Costa et al. [111]; Georghiou and Keenan [56]; Johnston [51]; Millet [114]; Van der Duin and Van der Steen [52]; Van der Steen and van Twist [20]; Yuan et al. [110] Ladikas and Decker [115]; Rohrbeck [57]; Yuan et al. [110] Bouwman et al. [116]; Rohrbeck [57]

Table 4

Main works on foresight and corporate foresight on organisation and performance.

Authors	Level		Focus			Performance	Variables
	Nation/ industry	Company	Strategy	Organisations	Management		
Alsan [45]		x	x	x			Coordination – specialisation Control systems – internal cohesion mechanisms
Amsteus [106]		x				x	Performance
Ashton et al. [43]		x		x			Decision processes – vertical decentralisation Control systems – internal cohesion mechanisms
Ashton and Stacey [34]		x		x			Structure – organisational unit definition Decision processes – horizontal decentralisation
Battistella and De Toni [61]		x			x	x	Performance
Borjesson et al. [117]		x		x			Decision processes – vertical decentralisation
Brockhoff [33]		x		x			Structure – organisational unit definition Decision processes – vertical and horizontal decentralisation
Bürgel et al. (2005)		x		x		x	Coordination – specialisation Performance
Daheim and Uerz [21]		x		x			Structure – organisational unit definition and dimension Coordination – specialisation
Davison (2001) [32]		x				x	Performance
Gassmann and Gaso [32]		x		x			Structure – organisational unit definition and dimension
Hayward [40]		x		x			Coordination – specialisation
Horton [44]	x	x		x	x		Decision processes – horizontal decentralisation Control systems – procedures formalisation and process Performance
Keenan and Popper [36]	x			x	x	x	Structure – organisational unit definition Coordination – specialisation Coordination – training Control system – internal cohesion mechanisms
Lackman et al. [37]		x		x			Structure – organisational unit definition Control system – internal cohesion mechanisms
Lichtenthaler [38]		x		x		x	Structure – organisational unit dimension Decision processes – vertical and horizontal decentralisation Coordination – specialisation
Ratcliffe [15]	x		x	x			Coordination – specialisation
Reger [19]		x		x			Decision processes – vertical decentralisation
Rohrbeck [6]		x	x	x		x	Structure – organisational unit definition
Rollwagen et al. [42]		x	x	x			Control system – procedures formalisation and processes Control system – internal cohesion mechanisms
Ruff [26]		x		x			Structure – organisational unit definition Control system – procedures formalisation and processes
Sanz – Menéndez et al. [35]	x			x			Structure – organisational unit definition
Slaughter [45]						x	Performance
Van der Duin and den Hartigh [12]		x					Decision processes – vertical and horizontal decentralisation
Volkery and Ribeiro [39]	x			x	x		Coordination – specialisation
Ughetto [41]	x			x	x		Coordination – specialisation Control system – internal cohesion mechanisms

Starting from these considerations, this paper aims to contribute to enrich the research field of foresight organisation, offering some suggestions on how to implement a CF

organisational structure and organise and manage supporting processes and tools to support CF activities and hypothesising if and how these key dimensions impact on performance. More

specifically, the present work is propelled by the following research questions:

- How is the organisation designed and structured by the companies to support Corporate Foresight activities?
- How do these organisational variables impact on Corporate Foresight process performance?

3.2. Research methodology

The research followed the steps for qualitative research on management suggested by Flynn et al. [68]: theoretical foundation identification; selection of the research design; selection of the data collection method; implementation of aggregated data; and elaboration of aggregated data.

Specifically, the process followed feedback cycles from theory to practice and vice versa. In fact, after a first literature review (on foresight and corporate foresight) [69] in order to comprehend the theme of Corporate Foresight and its differences with foresight itself, we did a pilot case study [70] that helped us formulate the research questions. After that, we conducted a second literature review, more focused on the themes of CF organisation and CF performance measurement. This second one contributed to identify possible organisational variables and possible performance measurements, and also to analyse and make sense of the data previously gathered from the pilot case. Finally, we did the multiple case study with a cross-case analysis among eight companies. During these case studies we tried to define a scale (from “very low” to “very high”) of organisational variables and performance. Very low means initial stage/awareness of the process, low means repeatable process, middle means defined process, high means managed process and very high means optimised process.

Specifically, the CF is a complex issue, still little investigated and little conceptualised [22]. For new investigations [71], to identify crucial variables [72], to observe a phenomenon in its complexity [73], to carry out a holistic and contextualised research, to collect a wide array of data [74], to study a phenomenon with a dynamic nature and process and where not-considered events play an important role in building explanations [75], an exploration is needed. We followed the suggestions of Voss et al. [76] for the choice of the case study for the research design: a pilot case study for the exploration and multiple case studies for the theory building. We chose a *pilot exploratory case-study* in an ICT company: the case stimulated our curiosity on the organisational aspects of CF, because they seemed to be predominant for the success of the innovation future-oriented strategy of the company. This guided us in formulating and detailing the research questions, in terms of internal structure, coordination, decision processes and control systems.

Then we followed the *multiple-case study* research design for the theory building. As suggested by Eisenhardt [71] and Voss et al. [76], theory building aims to identify and describe the key variables, the links among them and why these relationships exist.

For the pilot case study, we selected a case of success (in terms of importance and resources for R&D and final results of its innovation strategy) among the companies that implement foresight. The motivations of the choice were: fit

(it has a particular organisational model for R&D and a foresight-driven perspective for its innovation and strategy, i.e. it separates the R and the D functions and it has a specific foresight unit for detecting trends and giving directions to research and strategy), distinctiveness (it is a SME, but a case of success in terms of revenues and growth, and especially in terms of innovation and “future-fit”) and revelatory nature (the company gave us the possibility to directly observe the foresight activities) [77,71,72]. The unit of analysis has been the entire organisation. See Battistella and De Toni [61,70] for details on the pilot case study.

The multiple case studies selection that focused on a single industry sector is due to the will to deepen the analysis and to perform a better comparison. In fact, for a deeper understanding of the organisation and management for CF, for a systemic and contextual understanding [78], it is important to understand also the specific trends [42] and peculiar traits of the specific company.

The consideration of only one industry sector allowed us to have the same macro trends and macro weak signals at the level of the industry itself. In the few multiple case studies in available literature [13,79,80], no papers present a multiple case study in the same industry sector. There are in our opinion some important factors that can be factors of influence for a CF management and CF organisation and that can be understood by analysing the same industry sector, such as the different strategies of the companies (located at different levels of the supply chain). The telecommunication industry (TLC) has been chosen due to its relevance to foresight because it is undergoing a radical transformation [81]. The established value chain is increasingly being deconstructed, with the entry of powerful new players and radical restructuring of the industry [82]. Rapid technological developments and increasing market turbulences have added new dimensions to an already complex scenario. Many tested business models, as well as related frameworks, tools and techniques, have become obsolete [83]. Li and Whalley [84] underline that these changes are very radical; therefore all players need to re-evaluate their strategies. To intercept and deal with those changes requires innovation (and foresight) skills. In fact, the telecommunication industry is relevant for foresight from three points of view. At the political level, the mechanisms of standardisation and control make the coordination institutions important because they can shape the future by implementing legislative restrictions for example [85]. From a technology point of view, the industry is defined by high investments in R&D and by a strong importance of technological innovations. From an economy point of view, the length of time required for technologies to enter markets (long time between the availability of the technological innovation and its entrance and performance in the market) and the high uncertainty of the market require a strong component of vision and future-orientation.³ Moreover, the strong impact of technologies on the economic system but the marginal role of telecom companies is leading the latter to change their business model and organisation. Finally, the presence of multinationals and big industrial groups is important because they can shape the

³ These considerations have been obtained in a panel Delphi among experts on ICT and TLC focused on the as-is and to-be situation of the industry [69].

future of the industry itself [86]. Many companies in the TLC perform foresight activities because telecommunication companies have to reinvent themselves to survive, due to different influencers on the TLC industry [87]: market liberalisation caused monopoly firms to decrease their power position and revenues in core business [88]; “horizontalisation” of service architecture caused the increase of competition because lower entry barriers permit software developers to offer complex services [89,90]; and the shift of value distribution caused to have the value in services [91].

The seven cases are companies that have foresight activities (plus the ICT company of the pilot-case). These companies are the most important in Italy in terms of dimension and market share.

The main choice criterion has been the presence of foresight activities in the company. And, for the focus on a single industry, the second criterion has been the presence in the TLC industry.

For the multiple case study, we used the theorisation approach of *variance theory* [92]. We considered a target population related to companies with a potential for performing foresight activities: (1) for the possible importance of future-oriented strategy, we chose turbulent environments and (2) for the possible importance of R&D for innovation, we chose high-tech companies. Moreover, we referred to a first exploratory survey of Z_Punkt and Muller [3,21].

We selected the case with a *criterion sampling* strategy to increase the possibility to select cases with much information [93]:

- size of the company;
- market share;

and with a *stratified sampling* strategy to maximise the observed variance among the cases:

- focus (foresight-NPD/NPS-oriented or foresight-corporate strategy-oriented);
- supply chain level (to reduce the risk to develop theoretical insight connected to a specific position in the network).

The main contrast factor is the performance level in foresight capability. Other interesting differences are: the general objective of CF and the time CF is deployed in that company (strategy), the presence of the foresight unit (organisation), the presence of qualitative or quantitative techniques (management) and the level along the supply-chain (general).

The collection of data required 120 non-consecutive days of on-site visits, in a time-frame of analysis from 2006 to 2010 (50 days for the pilot case study and 10 days for every multiple case study). Multiple data collection methods were adopted to acquire a deep understanding of the dynamics involved. The aim was twofold: to increase information basis and to diversify data in order to reduce biases [72,93]. Documentations were semi-structured interviews (to foresight managers, CEOs, R&D managers, strategy managers), company documents and secondary data (press review and official company documents as website and archival documents). Moreover, in three companies the researchers had the possibility to participate directly in the foresight activities and/or to observe them. Data was coded using a structured coding tree based on the strategy, organisation, management

and technology dimensions. These were subdivided into other codes, e.g. organisation in coordination specialisation, etc.

As regards the interviews, from a methodological point of view, a relevant aspect is that the majority of the researches considered only foresight managers as key informants. The present research considered also other internal stakeholders, in order to reduce information biases. Table 5 summarises the studied firms, the interviews and the documentation.

To ensure the coherence and the consistency, a standard interview protocol was developed to be checked and to guide the interview:

1. description of the strategy and of the innovation strategy;
2. description of the general organisation, in particular internal configuration, network, actors, integration mechanisms;
3. description of the foresight activities and their organisation;
4. description of the managerial and organisational supporting activities for CF;
5. performance of CF.

4. Case studies

4.1. Corporate Foresight organisation – structure

The definition and dimension of the organisational structure are very different from case to case, as shown in Table 4. For example, some companies (e.g. Case A) strictly link the foresight activities with the research function for innovation objectives; other companies (e.g. Case B) instead link foresight with the strategy function for decision-making support. Moreover, foresight definition can be structural or more cultural. This means that in the first case (e.g. Case D) the company decides to build a foresight unit itself that has the aim to coordinate all the CF activities, while in the second case (e.g. Case C) the company assigns the task of foresight to the highest-level managers (Table 6).

It is then possible to define companies that have higher or lower levels of CF structure based on complexity of solutions, budgets, units connected, etc.

4.2. Corporate Foresight organisation – coordination

Companies differ as regards CF specialisation. Some companies think that CF is a very strategic activity. Some companies (e.g. Case E) institutionalise the nature of CF and have formal ways to subdivide the work and to acquire specialised foresight competences. They have been classified based on the importance of type of jobs and specialised competences.

Some companies (e.g. Case E) have also specific training courses to increase foresight competences and background Table 7.

4.3. Corporate Foresight organisation – decision processes

The degree of delegation of decisional power is not very different from case to case. Most of the companies have foresight activities that directly refer to the CEO, but differ in the degree of visibility of the activities throughout the company Table 8.

Table 5
The studied firms.

Firm	Business areas	Employees	Number of interviews (average of 40 min)	Role of people interviewed	Documentation received	Other
Company A	Telecommunications – manufacturer	25.000	10	R&D managers (1), strategy managers (5), foresight manager (2)	• Website	
Company B	Telecommunications – manufacturer	120.000	8	R&D managers (2), strategy managers (2), foresight manager (4)	• Website • Archival documents about strategy and foresight	Observation of foresight activities
Company C	Telecommunications – manufacturer	80.000	7	CTO (3), strategy managers (4)	• Website • Press review • Official company's documents	
Company D (pilot)	Telecommunications – operator	550	33	CEO (10), CTO (10), R&D managers (1), strategy managers (4), foresight manager (8)	• Website • Press review • Official company's documents (internal presentations of CEO about foresight)	Direct participation in foresight activities
Company E	Telecommunications – operator	77.800	8	CTO (2), R&D managers (2), strategy managers (2), foresight manager (2)	• Website • Archival documents about foresight meetings	Direct participation in foresight activities
Company F	Telecommunications – operator	10.000	12	R&D managers (4), strategy managers (5), foresight manager (3)	• Website	
Company G	Telecommunications – operator	60.000	6	R&D managers (2), strategy managers (2), foresight manager (2)	• Website	
Company H	Telecommunications – operator	20.000	6	R&D managers (2), strategy managers (2), foresight manager (2)	• Website • Archival documents about strategy • Official company's documents	

4.4. Corporate Foresight organisation – control systems

Companies adopted different solutions for internal cohesion and formalisation. For example, Case B has complex procedures for a proactive foresight action. As regards internal cohesion, this is very important for foresight in order to gather data and weak signals from the entire company but also to disseminate the results to the entire company. The solutions are different. For example, in Case C the cohesion of foresight activities is achieved through periodic meetings. Control is achieved through the strategy as a semi-specialised foresight unit or, in Case F, the control activity is delegated to the strategy unit [Table 9](#).

4.5. Corporate Foresight performance

Companies show different levels of foresight effectiveness and efficiency. For example, Case A has high levels of effectiveness and efficiency because it is able to find trends, to detect weak signals and has always had a good peripheral vision and environment sensing but with a good management of projects' priorities and innovation time to market. [Table 10](#) shows the synthesis of the indicators for all the companies.

5. Findings and discussion

5.1. Corporate Foresight organisation – structure

Companies built different systems in order to support foresight activities. Some companies have grounded their CF structure on external networks and a scouting structure, of “sensors” to pick up external weak signals and to best

implement the initial phase of foresight, i.e. horizon scanning [\[1\]](#). Other companies, however, have refined the internal structures for CF, at a structural level through special centres or units that deal strictly with CF or at a cultural level through the continued involvement of its employees, especially top-level management [\[70\]](#).

The multiple case studies contributed in finding the most important CF organisational practices. First of all, in order to foster foresight activities, different organisational forms have been established. These can be:

1. the activation of a dedicated foresight unit: this is important because people are dedicated only to foresight activity, concentrated on futures studies and build specific links with other internal units or external ones when needed;
2. the embedding of the foresight activities in another function (often: R&D if the focus of foresight is innovation, Strategy if the focus is decision-making or risk management, or Marketing if the focus is in investigating tomorrow's customers) with more or less formal or informal interconnections among these functions;
3. the formal interrelation among functions (mainly Strategy and R&D, or Strategy, R&D and Marketing) favoured by the institution of formal meetings, specific organisational roles, procedures and reports among them;
4. the informal interrelation among functions, i.e. not specified by the company but born through contacts and personal interactions;
5. the activation of specific task projects for foresight, i.e. foresight activity is not carried out on a continuous basis, but only when a specific need appears;

Table 6
CF structure.

Organisational unit/function definition	
A	The activities are done not only at corporate level, but also at the company level. The activities are done mainly connected with the Research and 4 internal departments are involved. Activities and specific units are inserted in the technological functions with the specific aim of innovation and future study. The objective of foresight activities is clearly stated and expresses by the top management and they are recognised along all the company. The budget dedicated to these activities is high (in comparison to general revenues and budget dedicated to R&D and strategy).
B	The foresight activities are done only at corporate level. Activities are mainly done with a strategic objective, in fact they are located inside the board of directors, in the central area. Foresight activities are inserted in other functions, with both strategy and technology focuses. The organisational subdivision influenced by the competence areas of the team-members and the specific projects of the moment. Three units that deal with CF within R&D.
C	The foresight activities are done only at corporate level. The activities have a very high level of importance: they are directly under the control of the CEO and are inserted at the board level, given also as a personal task to the highest-level managers. This solution is much more cultural than structural: every high-level manager has the task to do foresight activities that are considered as very strategic from the company itself. Activities are therefore inserted in the strategy function, at the group level. Structure is subdivided into three different thematic areas.
D	The foresight activities are done only at corporate level. There is one autonomous fixed unit, dedicated only to foresight activities. It is connected to Strategy, Research and Marketing. Division is conditioned by the competence areas of the team-members.
E	The foresight activities are done only at corporate level. The level of involvement is very high because 2 dedicated units and 5 internal departments are involved. The two dedicated units are one unit at the Strategy level in staff with CEO and an autonomous one. These are both strictly linked with Marketing, Technological Research and Economical Research. The budget dedicated to these activities is high. Foresight activities subdivided in 5 "vertical" projects and 1 horizontal about methodologies. The autonomous unit functions as an aggregation point, a "hub".
F	The foresight activities are done only at corporate level. The structure definition is very low, because the foresight activities are not considered as strategic and foresight is done only sometimes inside the strategy. Division conditioned by strategic projects of following competitors.
G	The activities are done not only at corporate level, but also at the company level. Despite the high number of units involved, the definition is very complex and does not have clear instruments for coordination. Activities are inserted in other functions (1 at the Group level, 3 departments involved in every company). There is a special team of Strategy inside Research – and in every company inside the Strategy, IT and Marketing. Despite all this complex organisational structure, the budget for foresight is modest, and also the objectives are not clearly stated and diffused inside the company. Structure in five different thematic areas (guidelines).
H	The foresight activities are done only at corporate level. The structure definition is low, because foresight activities have a budget and are inserted in the strategy objectives, but the structure and procedures are not well defined. Division influenced for business model. The budget dedicated to these activities is low.
Organisational unit/function dimension	
A	Activities are done at the CTO level, with ca. 200 employees (50 dedicated). They do activities full-time.
B	Activities are in the headquarters and many people participate, but only part-time.
C	Activities are in the headquarters and many people participate (ca. 150) full-time.
D	Activities are in the headquarters. There is a reciprocal adaptation, with a small unit of CF. The employees are 5 and part-time.

Table 6 (continued)

Organisational unit/function definition	
E	Activities are not only in the headquarters, but also are performed externally. Employees are circa 45 (30 dedicated) that do foresight full-time.
F	Activities are in the headquarters and only 3 people are involved in foresight activities. The dedicated time and human resources are low.
G	Activities are not only in the headquarters, but also are performed externally. Employees are circa 25 but they do foresight activities only part-time.
H	Activities are in the headquarters and only 3 people are involved in foresight activities. The dedicated time and human resources are low.

- the reliance on the vision and resilience skills of single persons (mainly top management or the CEO) or on the collective capabilities of groups (mainly high-level managers);
- the outsourcing of foresight activities to specific research centres or consulting firms because they give in outsourcing some specific activities, for example the investigation on general trends of the ICT industry.

Some of these levels (levels 1, 2 and 5) have already been discussed in literature in the work of Ashton and Stacey [34] on competitive intelligence. Jain [94] analysed the responsibility for the environment-scanning referring to the specific type of unit. Other studies [3] investigated the characteristics of the process showing that CF occurs at corporate, divisional or virtual levels.

This literature did not reveal that many companies do not use uniquely one of these levels, but customise the structure of CF based on their specific organisational structure and thus adopt multiple forms of CF structure. Considering the cases in relation to the general objective of CF (CF oriented to new product/service development or oriented to strategy oriented – Battistella and De Toni [70]), factors seem to need more specific projects and tasks, and the foresight oriented strategy gives greater emphasis on outsourcing of some activities (e.g. identification foresight in technology). These forms are characterised by different levels of organisational structure variables: nature (permanent or temporary, i.e. institutionalised and performed on a continuous basis or temporary and performed ad-hoc only at the time when it is specifically needed), integration and coordination level (i.e. formalised or not), centralisation (i.e. foresight activities are centralised at the corporate level or not), leadership (i.e. the role of the foresight manager).

The research drives important first suggestions as regards the organisational structure of the CF system. The case studies showed that one of the structural ways to improve CF performance is the presence of a CF dedicated unit. Companies have a structured definition of CF organisational unit/function when many functions are involved with a specific role and with a specific system for coordination of functions and/or decision-making managers.

One of the typical solutions for structuring the CF organisation is to have a foresight unit (see for example Case E). Case E for example builds a system centred on an autonomous unit of the group called Future Centre. It functions as an aggregation point and an international think tank in network that includes several outstanding features: Future Centre deals with studying

Table 7
CF coordination.

Specialisation	
A	Institutionalised nature of CF activities: very important role of foresight for innovation. Mainly technological/research units are involved. The functioning is granted by sharing technological roadmaps. IT manager experts in technology and in the specific sector. Not so high diversity: all people interested and with background in technology.
B	Project-based nature of CF activities. Labour is subdivided in Strategy and Research and is coordinated through periodic meetings among functions, database with trends. Top-management, IT manager, Experts in the specific sector, also external consultants. People with economics and technological competences
C	Institutionalised nature of the CF activities, but they refer mainly to the capabilities of management. Labour is subdivided in Strategy and Research and is coordinated with 3 different plans for different time-scales (1 year, 3–5 years and 10 years). Top-management Experts in economy. People with economics competences. It has established a new figure of internal scouts for coordination reasons.
D	Permanent and institutionalised nature of the CF unit and its relationships with other functions. There is a dedicated unit with strategy aims that is specialised in CF and links with Strategy, Marketing and Research. The coordination is through scientific committee meetings. Top-management, Experts in different industry sectors. Cognitive diversity (electronics, informatics, sociology, economics, biology, etc.).
E	Permanent and institutionalised nature of the CF unit and its relationships with other functions. There are two dedicated units. "Strategy and scenarios" and "Future Centre" are dedicated units: one with more strategic objectives, one with more future-research objectives. They are linked with Marketing, Research (Ti-lab innovation), Economical studies. There is a modest coordination. Continuous work on future ecosystems. Strategist, IT manager, marketing manager Experts in technological and economic matters, also external consultants. Very high diversity: both from a cultural point of view (people from Japan, China, Brasil,...) both from a competences one (economic, technological, competences) — high difference from the rest of the company.
F	Project-based nature of CF activities. Coordination is done by strategic manager only in the moments of necessity. The job is specialised in strategic aims.
G	Institutionalised nature of CF strategy-oriented activities — project-based nature of CF innovation-oriented activities. It is coordinated with periodic and specific meetings among functions in order to meet foresight needs — 5 guidelines every year. Strategist, IT manager, marketing manager. Experts in economic matters. People with economics, sociological and technological competences
H	Project-based nature of CF activities. Coordination is done by strategic manager only in the moments of necessity. The job is specialised in strategic aims. Strategist, marketing manager Experts in economic matters.
Training	
A	Employees are asked to identify future trends of technologies.
B	Employees are trained for CF activities and mainly to participate in a common database.
C	Management is asked to focus on imagine the future.
D	Employees are trained for CF activities: they learn about specific methodologies and past projects.
E	Employees are trained for CF activities: they learn about specific methodologies and past projects; There is a specific programme for employing people.
F	Strategist Experts in economic matters.
G	Employees are trained for their specific activities, in which they are encouraged to think in a "future-way".
H	Employees are asked to identify future trends of technologies.

Table 8
CF decision process.

Vertical centralization	
A	The main reference for CF activities is the CTO. Foresight activities directly refer to CTO. Middle visibility of foresight activities.
B	Foresight activities refer to a unit of staff of the board of director in Group. High.
C	Foresight activities refer to a unit of staff of the board of director in the Group. Middle.
D	Foresight activities directly refer to CEO — low vertical decentralisation. High: all the company knows about the importance of the CF activities
E	Foresight activities directly refer to CEO. Middle visibility of foresight activities.
F	Foresight activities directly refer to CEO. Low.
G	Foresight activities refer to a unit of staff of the board of director in Group. Middle.
H	Foresight activities directly refer to CEO. Low.
Horizontal decentralisation	
A	Horizontal decentralisation of activities does not happen.
B	High.
C	Horizontal decentralisation of activities does not happen.
D	Wide horizontal decentralisation because there is a strong involvement of other functions.
E	Wide horizontal decentralisation because main activities are in the "Future Centre", but there is a strong involvement of other functions, as the Ti-Lab Innovation (research function) for technical activities or "Economical studies" for specific studies on economic trends and impacts.
F	Low.
G	Middle.
H	Low.

and elaborating future ecosystems. Other units are connected: the technological unit provides "technology seeds" to the Future Centre, deals with new services and technology scouting and reports on future scenarios; the function of economic studies deals with macro-economic and sociological scenarios and the scenarios and strategies function.

Another example is Case B that configures three units that deal with CF within R & D. Case G and Case A do not have a centralised unit that does all the investigations on the future, but these activities are distributed in other functions (such as strategy and marketing in Case G or function level of R & D in Case A). Instead, Case C stresses the cultural dimension, the involvement of top management in CF: employees are motivated both to bring an analysis of trends and weak signals, and to help in disseminating the results of CF.

The key points and common to all case studies are the need to understand what the technology will offer in the future and the construction of evolutionary scenarios based on all information gathered in various business areas.

At the level of the organisational structure, we observed that a high level of articulation of the CF structure increases the effectiveness of foresight. In our sample, not all companies have followed a structured process. They differ in how they organise the CF system. Some companies like Case B and Case E designed systems for a continuous scanning process to provide early signals and be a trigger for innovation activities and strategy. Case C has a high level of CF organisational function definition also if the solution is not structural: the company decided not to have a fixed unit dedicated to foresight but to permeate the whole company, especially at top management level, with

Table 9

CF control system.

Procedures formalisation	
A	Case A does not present a high formalisation. The foresight is done with the aim of finding new chances and potential risks through configuration of the portfolio, allocation of resources, decisions on products/services. Procedures and tools are meetings and workshops among global and local innovation teams and innovation-scouting, issue-scanning, identification of trends. Horizon is from 3 to 5.
B	The foresight is done with the aims of configuration of the portfolio, new chances, potential risks. Procedures and tools are building of "cascade-scenarios", observation of trends in the market, identification of technological trends. Horizon is from 3 to 20 years. Case B, where all the procedures are well mapped and there are different procedures for different horizons, has a high efficiency in foresight because all these guidelines guarantee more quality of input data and of the process. All employees are invited to respect these guidelines in order to not lose time in such a difficult activity. Clearly, the foresight manager says, this does not guarantee neither quality of the output neither creativity and imagination. He underlines it is a difficult task to balance all these components. This formalisation for the manager is needed also to coordinate all different links and networks of foresight.
C	Case C does not present a high formalisation. The foresight is done with the aims of configuration of the portfolio, M&A, investments, new chances. Procedures and tools are building of "cascade-scenarios", participative building and discussion of alternative scenarios, options and strategies (of the executive management team) and observation of trends in the market. Horizon is 3 levels: 1, 3–5, 10 years.
D	Case D does not present a high formalisation. The foresight is done with the aims of configuration of the portfolio, M&A, new chances. Procedures and tools are participative process of scenarios building, workshops and trend-scanning, monitoring of issues, reporting of early-indicators of changes. Horizon is up to 15 years.
E	Case E does not present a high formalisation. The foresight is done with the aims of configuration of the portfolio, allocation of resources, new chances, potential risks. Procedures and tools are participative process of scenarios building, workshops and trend-scanning, analysis of ecosystems. Horizon is up to 10 years.
F	Case F presents a very low formalisation, they do not have procedures because they do not think at the foresight as a fundamental activity. Their strategy is much more related to defending the position and following the market leaders, therefore they do foresight only as a help for competitor analysis. The foresight is done with the aims of following portfolio and new chances. Procedures and tools are meetings and observation of competitors.
G	Case G does not present a high formalisation. Foresight is done but especially by means of meetings but not with specific dates set before or with specific ways to do the process. The manager believes this diminish the imagination ability of the people. Anyway, the meetings follow specific and typical processes. Also tools used are decided from a set of tools. The foresight is done with the aims of configuration of the portfolio, business development, strategies for new markets, decisions on prod/services, new chances. Procedures and tools are meetings among global and local teams and among different functions, participative guidelines and observation of trends in the market. Horizon is from 3 to 10 years.
H	Case H does foresight but with a really long perspective/horizon. This implies for them that foresight is an activity strongly interlinked with imagination and not with formalisation. Therefore they let the activity be really free. The foresight is done with the aims of business development, strategies for new markets, new chances. Procedures and tools are participative process of scenarios building, workshops and observation of trends in the market. Horizon is up to 15 years.
Internal cohesion mechanisms	
A	The cohesion of the foresight activities of different functions is done using IT systems. The control is done through the CTO as a unit integrated in the foresight. It expects the employees to build foresight formal and informal networks outside the organisation. This affects the effectiveness, in terms of information available, the chances of finding wild card and unexpected connections, ease of exploration of adjacent businesses, and white space, more access to creativity and cognitive diversity.

Table 9 (continued)

Internal cohesion mechanisms	
B	The cohesion of the foresight activities is done using IT. Control is done through the strategy as a unit specialised in the foresight. It expects the employees to build foresight formal and informal networks outside the organisation. External unit of scouting. Case B has complex procedures for a proactive foresight action. As regards internal cohesion, this is very important for foresight in order to gather data and weak signals from all over the company but also to diffuse the results in all the company. It expects the employees to build foresight formal and informal networks outside the organisation. The external relations allow collecting a large number of participants. The network thus enables the achievement of many different sources, a proactive scanning in long, medium and short term, scanning in as much areas as possible and in most places and the most "far" as possible (current business, and adjacent white space). Case B, for example, has assumed a unit of scouting only to it, so that the crucial information to be available only to itself.
C	The cohesion of the foresight activities is done using periodic meetings. Control is done through the strategy as a unit semi-specialised in the foresight. It expects the employees to build foresight formal and informal networks outside the organisation. In case C the cohesion of foresight activities is done using periodic meetings. Control is done through the strategy as a unit semi-specialised in the foresight.
D	Importance of the scientific committee. Through the CF unit as a unit specialised in foresight. It expects the employees to build foresight formal and informal networks outside the organisation.
E	The cohesion of the foresight activities is done using Future Centre role. Double level of control: through the Future Centre as a unit specialised in foresight and through the strategy as a unit integrated in the foresight
F	Through the strategy. In case F the control activity is delegated to the strategy unit, where most of the activities remain without diffusion.
G	The cohesion of the foresight activities is done using the Strategic unit at the Corporate level. Through the strategy as a unit integrated in the foresight. It expects the employees to build foresight formal and informal networks outside the organisation.
H	The cohesion of the foresight activities is done using the Strategic unit at the Corporate level. Through the strategy. Case H burdens all the activities to the strategic unit, and does not have relevant mechanisms for networking.

foresight tasks for all employees. Other companies implemented spot or task processes when requested by senior management. For example, Case E has a very well defined structure, and it is highly specialised in foresight, with increased capacity for sensemaking and attention to changes in PEEST, however in other cases such as Case H, the definition of activities is left to greater informality, and the ability to capture trends appears to be minor. Consequently, the theoretical propositions are:

P1a. The higher the level of the Corporate Foresight organisational unit/function definition, the higher the level of effectiveness of CF.

P1b. The higher the level of the Corporate Foresight organisational unit/function definition, the higher the level of efficiency of CF.

This is because the organisational structure increases the ability of sensemaking, the perception of the importance of CF for the company, the specialisation for foresight and the attention to changes in the PEEST. The efficiency is increased

Table 10

CF organisation and CF performance – synthesis.

			A	B	C	D	E	F	G	H
Organisation	Structure	Organisational unit definition	vh	h	vh	h	vh	vl	m	l
		Organisational unit dimension	m	m	l	m	h	l	l	l
	Coordination	Specialisation	vh	l	m	h	vh	vl	m	vl
		Training	l	m	h	h	h	vl	l	vl
	Decision processes	Vertical centralization	h	l	l	vh	m	l	l	l
		Horizontal decentralisation	m	m	m	h	h	vl	h	vl
	Control systems	Procedures formalisation	m	vh	m	m	m	vl	l	vl
		Internal cohesion mechanisms	h	h	vh	m	vh	vl	h	l
CF performance	Effectiveness		vh	vh	h	h	h	vh	m	l
	Efficiency		vh	vh	vh	h	h	h	m	vl

due to the prioritisation of projects, reducing duplication of effort and reducing time to market.

The size of the dedicated functions or those involved in CF activities are very diverse and depend on and are aligned with the company's more general organisational structure. The size also depends on decisions of the implementation of CF: if the company has decided to focus more on the formal structure or on dissemination of the task to all employees. Regarding the size of the organisational foresight unit, it varies significantly between one company and another, and compared to the size of the company, and it seems not to directly influence the CF performance. Looking at allocations of budget, time and human resources in the different case studies, it seems that the dimension of the organisational unit is not directly related to performance, for example Case F has a high budget for activities, but has low levels of CF performance.

5.2. Corporate Foresight organisation – coordination

As regards the specialisation of the CF organisation, it is opportune to institutionalise the foresight activity in the company [15]. The functions involved in CF are mainly Strategy, Marketing, Research and activities are carried out in very different ways, as for example with periodic meetings, or with top-down guidelines, etc. [19].

A key element appears to be a specialisation for CF. The foresighters and their skills and characteristics are essential [28]. They are curious, open minded and passionate and have a deep and broad knowledge. Their attitude and their skills are impacting on the effectiveness of the CF. This is because specialisation enhances organisational learning, storage of information with regard to R&D, strategy and marketing, knowledge on the possible new potential and knowledge of interconnections of firm activities. The cases show that

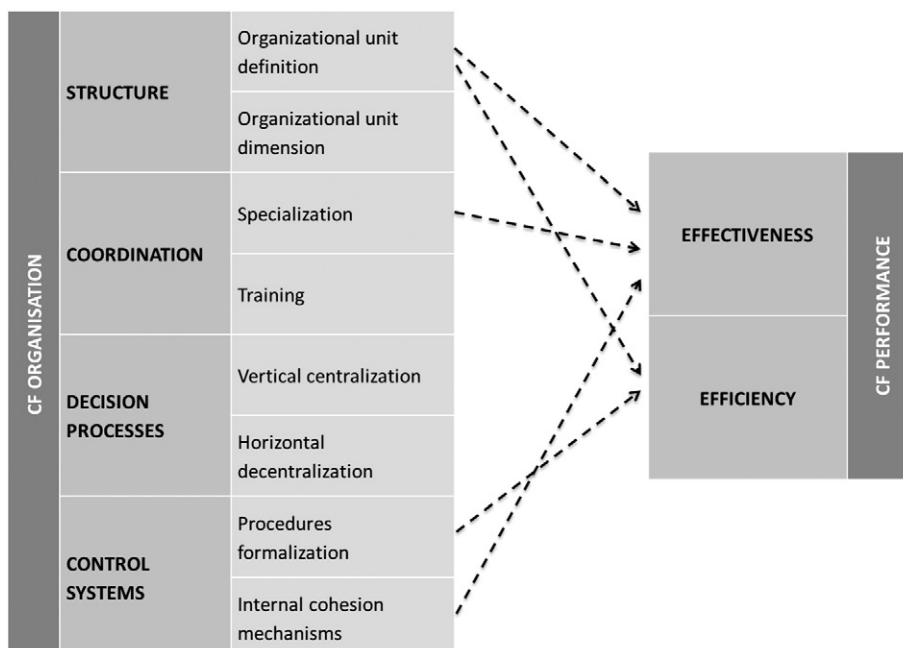
**Fig. 1.** CF organisation and CF performance – synthesis of the propositions.

Table 11

CF organisation and CF performance – cases and lesson learned.

				CF performance	
				Efficiency	Effectiveness
				<ul style="list-style-type: none"> • Time • Costs • Coherence (of methods and people) • Data quality and rigour • Support and trust, ethics 	<ul style="list-style-type: none"> • Knowledge • Learning • Capacity building • Social capital and people • Connection with strategy • Connection with innovation and research • Connection with marketing
CF organisation	Structure	Organisational unit definition	Definition is the basis through which different positions are grouped in organisational units	<p>In Case A, these activities are deemed important by top-management and it is recognised along all the company. There has been a big effort to adapt this organisation to the organisation of all the company. This is important because no activity will be perceived as useless.</p> <p>Adaptation to the general structure and the right positions, missions, functions, diminish the time and the costs of re-doing the study and increase the support and trust.</p>	<p>Activities can be defined structurally, as in Case A, or culturally, as in Case C. for example, in Case A activities are done at corporate and company level with a strong articulation of connections with other departments. This is important because this strong and complex definition augment the possibilities to absorb different and dispersed knowledge and to connect diverse perspectives in the organisation. In contrast, case F has a simple definition of the foresight organisation. The structure definition is very low, because the foresight activities are not considered as strategic and foresight is done only sometimes inside the strategy. The activities of this unit are conditioned by strategic priorities of following competitors. This way of organising does not guarantee effectiveness, because foresight needs to be connected to much and different knowledge "points of access". Complexity of articulation and units connected increase knowledge absorption and organisational learning. A good organisational structure definition permits to foresight results to be used in strategy, research and marketing.</p>
	COORDINATION	Organisational unit dimension Specialisation	<p>Dimension refers to the number of positions grouped in the same unit</p> <p>Specialisation refers to subdivision of labour</p>		<p>Case E gives an example of a high level of specialisation in foresight. The company strongly believes in recruitment of peculiar people with specific personal traits, i.e. specific traits for foresight (openness, creativity, complexity acceptance...) and diversity in culture and sensibility. Moreover, the company would like the functions dedicated and other ones (as research for example) to work and learn about foresight methodologies and to become experts of specific Specialisation provokes a culture of foresight. This increases capacity building, knowledge absorption and diffusion and learning.</p>

	Training	Refers to standardisation of knowledge through programmes of education	
Decision processes	Vertical centralization	Degree of delegation of decisional power	
	Horizontal decentralisation	Degree of delegation of decisional power	
Control systems	Procedures formalisation	Standardisation of operations through procedures, guidelines, etc.	Case B, where all the procedures are well mapped and there are different procedures for different horizons, has a high efficiency in foresight because all these guidelines guarantee more quality of input data and of the process. All employees are invited to respect these guidelines in order to not lose time in such a difficult activity. Clearly, the foresight manager says, this does not guarantee nether quality of the output nether creativity and imagination. He underlines it is a difficult task to balance all these components. This formalisation for the manager is needed also to coordinate all different links and networks of foresight. In contrast, for example Case G does not present this formalisation. Foresight is done but especially by means of meetings but not with specific dates set before or with specific ways to do the process. The manager believes this diminish the imagination ability of the people. Procedures and guidelines do not guarantee quality of results, but diminish costs and times of setting-up the study and ensure higher rigour.
	Internal cohesion mechanisms	Tools for reciprocal adapting of organisational units	Cases A, B, C, E, and G expect the employees to build foresight formal and informal networks outside the organisation. This affects the effectiveness, in terms of information available, the chances of finding wild card and unexpected connections, ease of exploration of adjacent businesses, and white space, more access to creativity and cognitive diversity. Cases B and C for example have internal or external units specialised in foresight that function as hubs and increase the possibilities to build networks, to find relevant information, and unexpected connections. In contrast, Case H burdens all the activities to the strategic unit, and does not have relevant mechanisms for networking. Task forces, internal and external networks increase knowledge absorption and diffusion, capacity building and social capital.

specialisation increases the effectiveness of the CF mainly in terms of organisational learning: knowledge of interconnections and knowledge of possible new potential, determining factors in foresight. This is certainly evident in Case C, that established a new figure of internal scouts for coordination reasons. Moreover, it seems that diversity of CF actors is important. In fact, Case E has for example a very high diversity of people, both from a cultural point of view (people from Japan, China, Brazil,...) and from a competences one (economic, technological). This is important because they contribute specialised and diverse competences that increase the possibility of cross-fertilisation and of a higher effectiveness of CF. therefore it may be stated that:

P2. Specialisation in Corporate Foresight increases the level of CF effectiveness.

5.3. Corporate Foresight organisation – decision processes

Literature says that it is opportune to integrate the CF results in the strategy [95]. Tools can be formal meetings, databases, reports, etc. The horizontal relationship can be reinforced through linking and gatekeeper positions (a staff dedicated to coordinating and integrating the results coming from the different areas involved in the CF activity, i.e. strategy, R&D, marketing). The solutions may be to centralise the activity in a dedicated unit and to decentralise the more technical activities in the research function or to decentralise the CF activities in the functions of strategy, research and marketing and to have a person or a staff dedicated to the coordination or to have frequent (circa one every month) meetings. It seems from the case studies that vertical or horizontal centralisation is not directly connected to CF results: the solutions from the companies are very different, some companies centralise the activities in only one unit, some companies spread their foresight activities to all the top-management level, some companies decentralise the activities or externalise them. One important aspect seems to be the role of the CEO and his/her staff, in terms of leadership and in terms of diffusing a “CF culture”.

5.4. Corporate Foresight organisation – control systems

Case B, where all the procedures are well mapped and there are different procedures for different horizons, has a high foresight efficiency because all these guidelines guarantee more quality of input data and of the process. All employees are invited to respect these guidelines in order not to waste time in such a difficult activity. Clearly, the foresight manager says, this does not guarantee neither quality of the output nor creativity and imagination. He stresses that it is a difficult task to balance all these components. This formalisation for the manager is needed also to coordinate all different links and networks of foresight. In contrast, for example case G does not present this formalisation. Foresight is considered but carried out mainly by means of meetings without specific set dates nor a defined process. The manager believes this diminishes the imagination potential. Case G, in the middle, presents a middle level of formalisation. This means that foresight is considered but carried out mainly by means of meetings without specific set dates nor specific ways to do the process. The manager believes

this diminishes the imagination potential. However, the meetings follow specific and typical processes. Tools taken from a set of tools are also used.

Procedures and guidelines do not guarantee quality of results, but diminish costs and times of setting-up the study and ensure higher rigour. They increase the efficiency in terms, for example, of the use of existing information and reports and the use of a business ecosystem logic [96] in the foresight projects. It is therefore necessary to support each external network in order to have more and different information sources. Information and experience are fundamental in CF, which cannot be outsourced because of their strategic importance.

P3. A higher procedure formalisation level increases the level of CF efficiency.

The CF network, and especially the external one, is very important for CF [21,25]. Companies encourage the construction and maintenance of a network of external partners and it is perceived as important by employees. Cases A, B, C, D and G expect the employees to build formal and informal foresight networks outside the organisation. This affects the effectiveness, in terms of information available, the chances of finding a wild card and unexpected connections, ease of exploration of adjacent businesses, and white space, more access to creativity and cognitive diversity. This external network is certainly exploited in Case B for example, where foresight activities are carried out at corporate level but many internal and external people are connected in order to define the guidelines for foresight, strategy and research on an annual basis.

It has been shown that the practice of linking people to other people, in order to pass the results of CF to people that can start new initiatives in CF, is a method for increasing the innovation capacity of a company [6]. The external relations enable collection of a large number of participants, which can positively influence the performance and success of a CF activity [97,98]. The network thus enables the achievement of many different sources, a proactive scanning in long, medium and short term, scanning in as much areas as possible and in most places and the one that are “farthest” (current business, and adjacent white space). Case B, for example, has assumed a dedicated scouting unit, so that the crucial information is available only to itself.

P4. A higher internal cohesion mechanism level increases the level of CF effectiveness.

6. Conclusions

The present work underlines the potentialities of the logics of anticipation and foresight. In this paper, we propose multiple case studies that explore and discuss the organisation for a future-oriented strategy. The paper tries to link the organisational aspects of foresight with performance, and to identify indicators that enable us to understand the most opportune organisational conformation for long-term strategy and future innovation. The multiple case study cross-analyses showed for example how the organisational definition influences both the effectiveness and efficiency of CF, while the effectiveness of CF is influenced by specialisation

and mechanisms of internal cohesion. Fig. 1 shows the synthesis of the propositions and Table 11 shows the synthesis of the explanations.

The study highlights how the attention to innovation and to the market of tomorrow requires a company to adopt a special organisation and configuration of R&D and strategy and supports processes as foresight. The work underlines that it is the way in which organisation itself organises for uncertainty, not only the foresight unit that is particularly significant. It is the capability to develop options and a flexibility of organisation that allows rapid changes to occur. The future-management system to increase the Corporate Foresight capability of a firm can be based on cultural, organisational and managerial practices. In synthesis, from an organisational viewpoint, the case studies suggest that the CF system may be characterised and supported by:

- **defining a particular system for foresight.** It can be a more “structural” solution – a dedicated unit strongly connected to Research (Foresight Unit) or favouring external networks (e.g. collaborations with universities and research-centres and R&D partnerships) – or it can be a more “cultural” solution – supporting the organisation with soft factors (build corporate sensors for scanning of emerging change);
- **specialising for foresight, i.e. increasing the capacity of being and becoming sensitive to the trends and weak signals leads to greater attention, availability, willingness and readiness to listen and to react strategically and innovatively to internal and external changes in the PEEST.** Actors should have the ability to learn quickly and identify external environmental change. Foresight actors can be shared with other functions such as Research, Strategy and Marketing. This, beyond cutting costs, is useful to augment the possibility of involving all the internal stakeholders. Diversity of human resources, that is fundamental for foresight, can be obtained through the initiation of a “scientific committee” with experts in different fields who challenge the basic assumptions.
- **building internal cohesion (e.g. scientific committee).** The company needs particular mechanisms, common codes of communication and coordinated search procedures for foresight and learning. Here the role of the top-management is important. The CEO and his collaborators need to support the spreading of the foresight culture, recognise the need to give action to foresight results and drive the strategic decision-making and the innovation, inform on the change. Here the internal and external networking activities are fundamental. Trends and weak signals can be searched through open innovation approaches of connection with research centres and universities (typically, organisations that are focused on the future). The information can be increased in number, in depth and width by favouring the openness of ideas through the channels of the foresighter and the actors of the scientific committee (also their tacit knowledge), by considering a wide range of issues and trends outside the industry and by including peripheral information.

The findings have implications in both academic and managerial fields. From an academic point of view, the work represents a value because it is a first work that tries to link corporate foresight organisation with performance. From a practitioner's point of view, it is a basis for managers who

would like to understand how to structure the “foresight engine” in order to give attention to the market of tomorrow and to understand how to implement CF in their enterprises. Moreover, it gives actionability to the foresight activities: it enables a firm to understand how to put them into practice and to operate them, and it provides descriptions of its implementation and the most advanced practices to support it and thus to achieve an organisation geared toward future-oriented strategy and innovation.

The paper presents some limitations and further work in this direction is surely needed. First of all, the choice of the single industry can be seen as a positive factor (it enables to deepen the analysis) but needs to be extended. The research can then be extended through a multiple-case analysis in other industries to increase the research panel and to permit comparison with other sectors. Another limitation is referred to performance: it is clear that the measurement of the CF performance is not an easy task, and further work is needed to formalise the constructs of CF organisation and CF performance. Moreover, different contextual variables can be found that influence the design of the organisation. Finally, a survey research is needed to investigate the causal relationship between the organisational variables identified and the CF performance.

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