Managing Intangibles and Improving Governance Through the Theory of Complexity

Piero Giammarco and Cecilia Casalegno

1 Introduction

Almost everyone agrees that the value of a company depends on its intangible assets and their tangible counterparts. Centuries of experience in handling material elements have provided us the technical skills, correct approach, and right tools to manage, evaluate, and work with tangible assets. However, the same cannot be said for intangible goods.

The existence of a common link between the enterprise value of tangible and intangible assets has meant that research on the latter has focused on the same methodologies of management and evaluation, without considering their very different nature. Tangible goods, in fact, can be integrated to complicated systems; through a study of their decomposition into more elementary parts, it is possible to understand a larger system made up by tangible goods (for example, a clock).

This type of approach has ancient origins. Galileo Galilei and René Descartes proposed using such an approach, which is now at the basis of what is called classical science (Morin 2001). As far as intangible goods are concerned, a similar approach based on the study of their decomposition into smaller elements to understand difficult concepts, does not have the desired effect. When it comes to understanding such complex behaviours, the whole system has to be considered in its entirety, including its entities and relationships that connect them (as in the case of a society).

Intangible assets are characterised by a multielement structure; the elements, in turn, are connected to each other by a dense network of relationships. Stimulation of this network at any point can trigger an impact on the whole system through a feedback process, and the effects can be far-reaching for the system. This feature of

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intangible assets links them to the elements described in the theory of complexity (Morin 2011). This last, in consideration of the fact that its object of study is different from the one of Classical Science, does not arise as an alternative, but defines proprietary environments that cannot be integrated for the two approaches and thus presents warnings on the dangers concerning the use of a type of study approach in an incorrect setting.

The blurred borders between complex systems and non-complex (or complicated) systems is one of the problems that make the management of assets very difficult. As mentioned above, particular tools and logic systems can help in one case, but in other scenarios, they may be not only useless, but even harmful, because they can also lead result in contexts worse than the initial ones. These situations are called 'hypersolutions' by Paul Watzlawick (1998). Therefore, classical science can explain what is complicated, but, as stated above, not complex systems.

This points to the need for equipping oneself with tools to identify when and whether one is in the presence of a complicated or complex system. Our aim is not to debate which is correct, but merely emphasise that it is necessary to consider the different elements that need to be faced and their dynamics before deciding to adopt a way of acting aprioristically.

Therefore, it is necessary to define, first, the concept of a complex system. A system is called complex when:

- It is composed of several parts or elements that are individually identifiable and more or less complex themselves;
- The objects which comprise it are connected by relationships or interactions between them (be it economic, physical, social, etc.) through a multitude of non-linear local interactions;
- It has an open or semi-open structure;
- Its components have a relational network structure of their own;
- It is a specific entity with well-defined behaviours and functions.

Local interactions refer to the conditioning effect that each element has on the contiguous elements. Non-linearity refers to the fact that the verse of conditioning does not necessarily have a rectilinear development. A system is called open if it interacts with the environment and, through this interaction, exchanges energy, information, and matter. It is a semi-open (or semi-closed) system when a complex system prioritises the integrity of its internal structures, keeping a check on the incoming flows in the aforementioned exchanges (De Toni and Comello 2005).

The opening and exchange with the surrounding environment, which is also composed of complex elements, brings with it disturbance and disorder that can alter the equilibrium of the system. This system identifies, from among these elements, those that can be integrated and that can enhance its connections for its survival.

The present research is based on the hypothesis that the system of intangible assets is similar to a complex, semi-open system, and therefore, it must be studied and managed using the theory of complexity. The research question (RQ) this paper/chapter wants to answer to is the following: which is, inside the theory of

complexity, the most effective and comprehensive intangibles management? By analyzing the literature and by crossing it to a three years qualitative research conducted on a group of 47 companies in the Italian North-West (2012–2015), it has been possible to find out the model through which, by exploiting the bases of the theory of complexity, managers should handle intangibles. The typical features of this approach constitute the conceptual basis for the construction of our model, which can aid in the management of intangible business assets. This model, which considers non-linear connections and feedback, has been used in a research to test its effective operability.

2 Theory of Complexity and Intangibles

Before to analyze the literature concerning the theory of complexity and its links to the intangibles, it is useful to indicate the reason why it has been chosen as field in which to contextualize this research. We are talking about a theory of complexity was conceptualised in a culturally diverse environment; physicists, biologists, ethologists, sociologists, doctors, psychologists, and economists have worked on its definition and progressive structuring (McElroy 2000; Mason 2007). This transdisciplinary approach has led to the immediate condonement of a systemic view regarding the theory. The factor that has united all the scientists who have contributed to the theory's development is the inability of the classical analysis system to explain some phenomena (Klein 1984).

Consolidated methodologies and principles such as decomposition, reduction, and inductive–deductive identity were abandoned to endorse a completely different approach.

There are numerous differences between the two systems that motivate the different operational approach. The most important ones are highlighted in the Table 1 (Lazzarini et al. 2014):

The acceptance of the relationship network between all elements drove scientists to focus not only on the nodes of the network, but also on the links that held it together and then the messages that were conveyed through these links. One of the basic elements of the theory is the concept of non-linear local interactions, which refers to the property of these systems to cause a diffused effect on the network, thus triggering a subsequent series of other non-linear local interactions (Figs. 1 and 2).

A process such as this can, starting from a single impulse, trigger a series of effects on the entire network. These effects are conveyed by a founding concept: the relationship between actions and feedback that links the different elements (or nodes) of the system. This concept states that each interaction between two elements involves an effect of one on the other (the action) and, in reverse, an effect of the latter on the former (the feedback) (Cantino et al. 2016).

Such feedback can take positive or negative values (the terms 'positive' and 'negative' signify amplifying or inhibiting effects), conditioning the element that triggered the action in terms of amplification or inhibition, and leading to subsequent

Table 1 Comparison of complicated and complex systems

Complicated systems	Complex systems
• Characterised by linear interactions and simple causality • Composed of (numerous) simple elements • Fragile • The elements that compose them maintain their identity • They adapt to a static environment • Relationships between elements are determined by the structure • System balance • Closed system • Extreme cases are irrelevant and the media is important • Order	• Characterised by non-linear local interactions and mutual causality • Composed of complex elements • Robust • The elements that compose them change their identity • Maintain interactions in a dynamic environment • There is a continuous interaction between the structure and relationships between elements • No system balance • Open system • Extreme cases are important • Disorder

Source: Authors' personal work

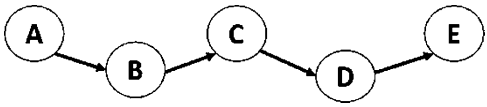


Fig. 1 Linear local interactions (Source: Authors' personal work)

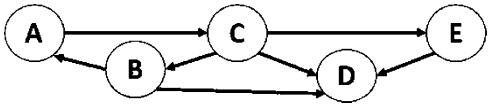


Fig. 2 Non-linear local interactions (Source: Authors' personal work)

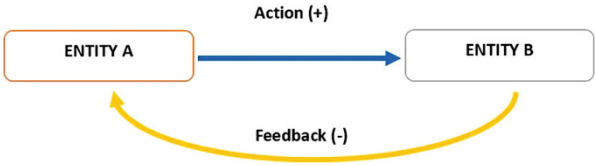


Fig. 3 Negative feedback (Source: Authors' personal work)

actions on all elements connected to the two initial elements in a continuous conditioning process (Fig. 3).

Negative feedback is when the first element stimulates a second one, which, in turn, inhibits the first one. This process brings the systems to equilibrium, where they can be stabilised by oscillating around the point of equilibrium (dynamic equilibrium). An example of a system governed by negative feedback is the relationship between predators and prey (Fig. 4).

Positive feedback, on the other hand, leads a component to stimulate a second component which, in turn, triggers a stimulating effect on the previous one. In such a process, if there is no negative feedback, the system can converge and move towards an explosion. Once triggered, this is a powerful and difficult phenomenon to interrupt, and it can keep systems away from reaching equilibrium.

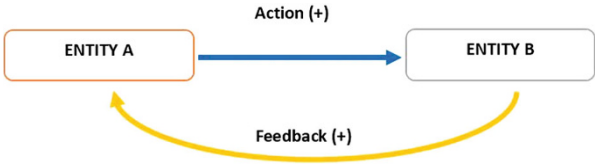


Fig. 4 Positive feedback (Source: Authors' personal work)

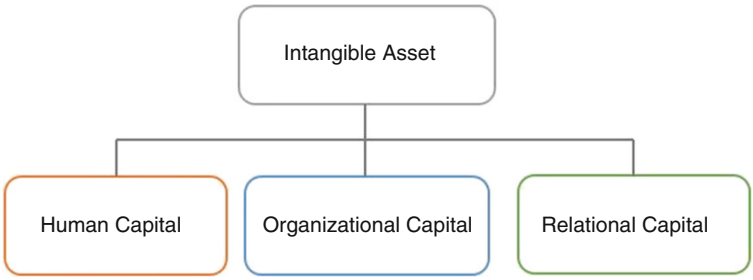


Fig. 5 Elements of intangible corporate assets (Source: Authors' personal work)

This continuous process allows the formation of so-called emerging phenomena, or surprising and unpredictable events, that transcend the limits of the current system elements, thus causing substantial unpredictability of complex systems.

Such emerging phenomena is a feature of complex systems, and depend on the interaction between individual elements. It determines the global behaviour of the system and assigns them properties that may be completely unrelated to the individual elements (Gandolfi 1999).

These features make complex systems more resistant to perturbations than systems that are less or not complex, and if these latter systems cannot adapt and can risk a block, the former ones will tend to evolve through the search for a new equilibrium. This means complex systems are characterised by strong resilience.

The system of intangible corporate assets is often represented as composed of three elements—human capital, organisational capital, and relational capital—but graphic simplification indicates a large number of elements in each asset and an even broader network of relationships among them, which also connects the three logical groups which comprise them (Fig. 5).

Intangible assets demonstrate all the typical features of complex systems:

- Their elements are generally linked through non-linear local interactions; the actions that affect an element can trigger some feedback on the element that caused the action in the first place, as well as actions on other elements of the same asset and on those of the other two assets.
- The three intangible assets are complex objects and, in turn, are composed of other complex objects.
- They have strong resilience (or robustness). For instance, they can absorb internal stimuli and external disturbances without being damaged because they are flexible.

- They are adaptive and respond to environmental changes and evolve when the elements that compose them are altered.
- They are placed in a dynamic environment that is also a complex system.
- The relationships between elements have an effect on the elements themselves.
- The system, although tending towards balance (with the exception of continuous positive feedback), never reaches it.
- All three intangible assets are semi-open systems that can condition each other and are simultaneously conditioned by the external environment.
- Knowledge of extreme cases facilitates awareness of different possibilities of evolution/involution.
- They are characterised by a certain level of disorder.

Thus, as the complexity of an organisation increases, the capacity to bear disorder and, consequently, the expressed vitality, increases. This happens owing to a more distributed decision-making mechanism that allows the elements of the system to react quickly to contingent or sudden problems without going through a central hierarchy.

3 A Model to Manage Intangibles

The goal of managing complexity must not make us expect a stratagem that allows us to foresee the unexpected or know the future (Rosenhead 1998). In fact, this would be paradoxical because it would give rise to a previously mentioned contradiction: the behaviour of a complex system cannot be predictable even when we know precisely the elements and laws of interaction that constitute it.

The proposed model does not set the objective of attributing the relations between the elements in a renewed reductionist optic to a linear cause–effect dynamic, but aims to assist in the management of a complex system by retaining focus on the entire structure while hypothesising interventions (and therefore actions) on the entities that compose it. Thus, we avoid the risky tendency (at least in terms of complex systems) to focus concentration on the specific object of the intervention.

The purposes of this model are multiple:

- To detect the network of connections between the elements of a complex system, and
- To build scenarios on a time basis founded on the various planned actions.

Such a model cannot be used while ignoring the identification and analysis of some key elements of reality; the weights and links found in one reality may differ from those in another in very important ways (Pena 2002). For this reason, it is necessary that researchers strengthen the understanding, through the study of reality and interviews with privileged informants, of the basic elements of the system under study, such as:

- The history of the reality analysed;
- The dynamics during particular events;

Fig. 6 Human capital and its variables (Source: Authors' personal work)

- The current situation and its dynamics;
- Identification of the various elements on which the system is based;
- Identification of external elements and systems;
- The typology of relationships/values connecting the entities (the reference framework);
- The weights of actions/feedback of the various elements; and
- The effects of noise from external elements and systems.

The list makes it clear that no instrument can be applied in all realities, and situational calibration and adaptation are necessary from time to time (Lazzarini et al. 2015). Furthermore, it is important to clear our proposed model's field of use. The objective is not to measure the value of intangibles, but to help policymakers manage them. The intangible assets, as mentioned, can be an incredible accelerator of change, but also an unsurpassable obstacle (Lazzarini et al. 2014).

An essential factor for achieving the aims of the model above lies in identifying the elements of the intangibles on which the system is supported and the declination of the same in the various subsystems. The various subsystems can be considered the variables of the system.The model, aimed at understanding the dynamics that exist within the complex intangible assets, is initially divided into components that have been widely accepted in the literature:

- Human capital
- Organisational capital
- Relational capital

The study of the dynamics connecting the three assets, however, needs to limit the analysis to the configuration of a single asset, in order to identify the structure of the present subsystems and their degree of mutual influence. Therefore, while using a discrete simplification approach, we identify a set of variables that can be linked to the various assets (Figs. 6, 7, and 8).

These variables can be considered complex subsystems of the single asset, but their availability and measurement are still difficult. Each of them is the result of the mutual interaction between a series of elements in the company, linked to the variables and characterised by high traceability. These elements can be observed through

Fig. 7 Organisational capital and its variables (Source: Authors' personal work)

Fig. 8 Relational capital and its variables (Source: Authors' personal work)

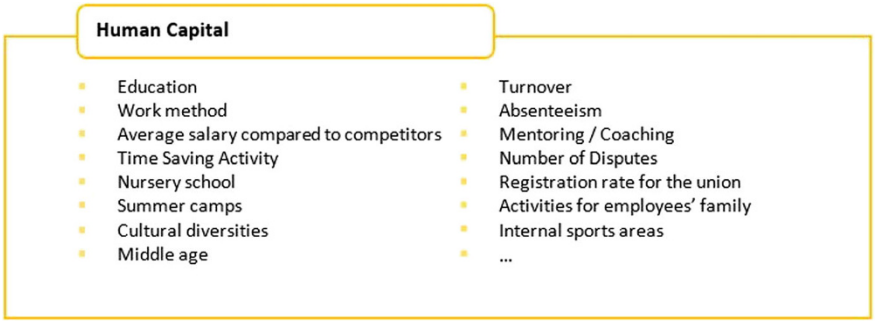


Fig. 9 The human capital asset and its measurable variables (Source: Authors' personal work)

the study of the organisation's history; analysis of balance sheets, image, and reputation; and administration of questionnaires to selected company employees.

Measurable elements should not be considered universal; they change from one company to another as they are a function of, for example, the dimension, history, contingent situation, and political and territorial environment in which the organisation is situated. An identification process targeting them should be carried out from time to time to adapt the system to the business reality, as in the example shown in Fig. 9 and in the following sections (Figs. 10 and 11).

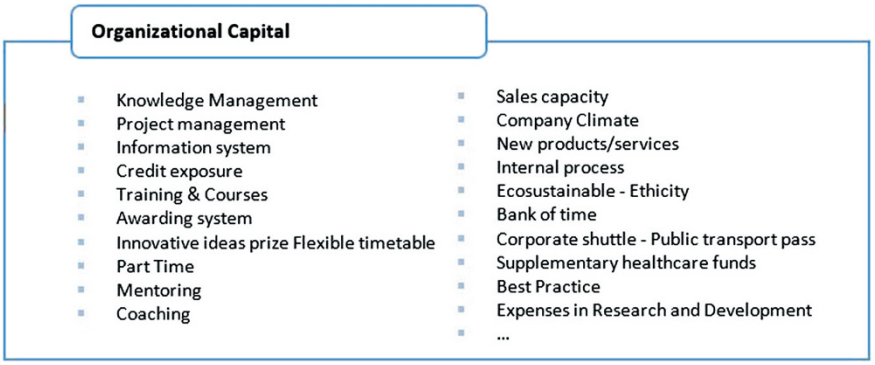


Fig. 10 The organisational capital asset and its measurable variables

Fig. 11 The relational capital asset and its measurable variables (Source: Authors' personal work)

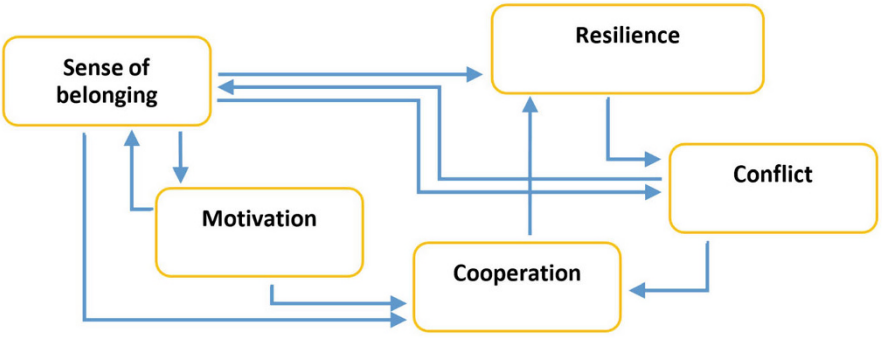


Fig. 12 Internal dynamics of the human resources asset (Source: Authors' personal work)

Once the measurable variables have been identified, it is necessary to weigh their contribution to the variables. This can be determined by concentrating the investigation on the dynamics within the asset. For simplicity, only the significant feedback dynamics will be shown, for example, in the case of human resources (Fig. 12).

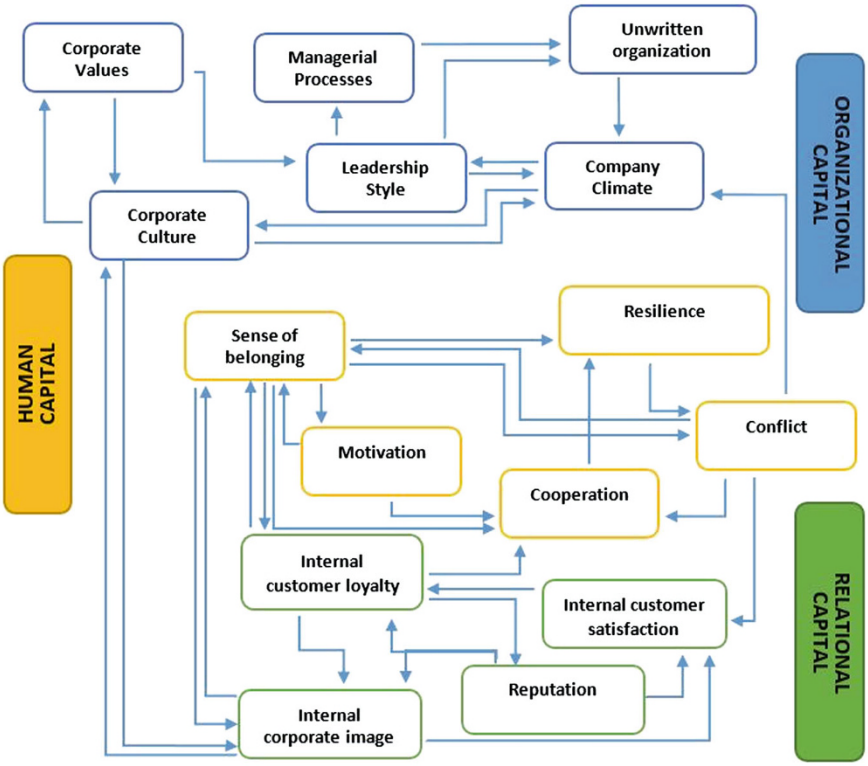


Fig. 13 Interaction among different assets (Source: Authors' personal work)

Then, the within-asset relationships are extended to between assets, and thus, it is necessary to note how these can affect the assets in their entirety. Extending the example above (Fig. 13).

Finally, the dynamics are enriched with the verse (positive or negative), feedback relationships, and influence weight; this highlights the changes in the subsystems and in the assets following interventions on them.

However, organisations and complex systems, in general, are not closed. Therefore, it is necessary to consider external perturbations in the model, which affect the assets, their subsystems, the dynamics triggered, and the possible 'vicious circles' that can be created (Fig. 14).

In an environment like this, it is evident how actions or occurrences reverberate over the entire aggregate of assets (Cravera 2008). Therefore, a similar model retaining the attention on the whole structure focuses on the coherence of the interventions (be they original or corrective).

Such a situation ensures a collective intelligence, so that the entire structure can respond quickly. It should also be able to understand changes in variables and implement actions promptly and effectively.

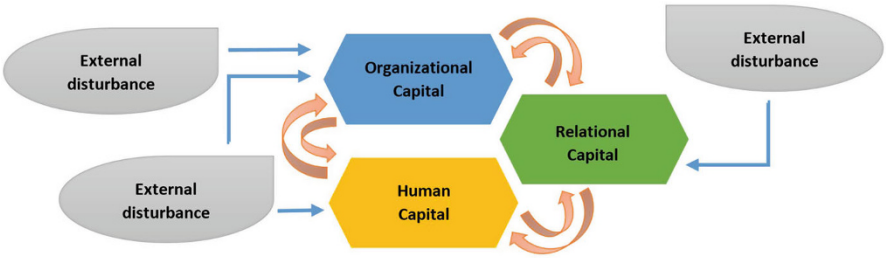


Fig. 14 Dynamics among assets with external perturbations (Source: Authors' personal work)

4 Research Methodology

A qualitative research was conducted on a group of 47 companies in Northwest Italy from 2012 to 2015, with the objective of testing corporate welfare actions to correlate them with the health level of the intangible assets of the companies involved (Lazzarini et al. 2015). It was, therefore, possible to test the model to prove its operability and its ability to propose scenarios that facilitate policy adoption.

The 47 companies involved were divided into three groups as follows:

- 16 companies that have less than 100 employees
- 9 companies that have 100–500 employees
- 22 companies that have more than 550 employees

These companies belong to different product sectors and have a core business oriented to the production of goods or services. To test the model, each company, as an additional feature, was required to have passed a restructuring event or undergone a moment of important change inside the company itself. This last element was considered important because it would generate many reactions and useful information and help calibrate the model weights.

The sample was chosen with subdivisions that enable acquiring information on the management of corporate welfare in relation to the various structures of the companies; although not very large, it was, however, considered representative thanks to its composition. Data was collected through questionnaires and interviews with management members of the company.

Data collected during the research allowed for the comparison of the welfare actions carried out by many companies of different sizes and belonging to different sectors (both producers of goods and services). This, in turn, made it possible to compare the effect on the respective intangible assets by identifying a series of items.

The research was considered an excellent test because, through the welfare actions, a significant amount of data emerged that can condition intangible assets. To ensure the anonymity of the investigated companies it was necessary to accept a more limited analysis of relational capital because it was not possible to verify the

impacts on external stakeholders on the position and behaviour of companies, but the informative patrimony allowed the researchers to perform a complete test.

The process, from the data obtained from the questionnaires and the interviews up to the decision support model, requires the description of all the different steps involved, which are important for a better understanding of the complexity management approach.

The companies were divided into groups, based on their dimension, in consideration of the fact that the size of a structure can also have a significant influence on certain features such as, expectations, communication, reaction, and involvement; therefore, this had a reflection on the weights associated with the items in the different situations.

The link between an item and an intangible asset is not direct in many cases, but is necessary to identify a relationship between two elements to hypothesise which and how many other elements can be modified.

The passage from the items to the intangible assets was therefore carried out through a series of elements constituting the intangibles themselves to which the items were linked. But the process was not yet concluded as complex systems are different from complicated systems because of the increased presence of several local and non-linear multiple interactions. This involves, as complex entities, both the intangible assets and the intermediate elements that constitute them.

Considering these multiple relationships, it is possible to hypothesise an indicative level for the single intangibles and a projection of the same in the future (in equal terms, and, also, by introducing some perturbations provided to identify in advance the effects on the system and to decline them appropriately). The companies are located within a society and a territory and, therefore, the many messages and feedback exchanged affect elements within the organisation, causing changes.

The company is not considered a passive element towards the territory and society, but an active member operating in the environment, with which it exchanges messages.

The concept of stakeholder widens considerably, including company stakeholders, from an economic, social, political, institutional, cultural, and mediatic point of view; this, according to the autopoietic approach, allows the system, previously considered closed, to select and cultivate useful relationships to increase the value of their intangibles and, ultimately, the value of the company.

These words can be quite abstract without exploring the items and the intermediate elements and their effects on intangible assets. Therefore, it is necessary to examine how the items, derived from the interviews discussed here, can be connected to these elements (or intermediate variables) and how they can condition them.The figures below show which items contribute to the intermediate variables grouped as human capital, organisational capital, and relational capital.

An analysis of Figs. 15, 16, and 17 reveals one of the peculiarities of complexity: not only do the items have an effect on the intermediate variables, but also the same intermediate variables (the intermediate variables that influence other intermediate variables are marked in bold), regardless of the asset in which they are placed, can affect each other.

Fig. 15 Human capital items and intermediate variables (Source: Authors' personal work)

5 Results and Discussion

5.1 Complexity Analysis Applied to Present Time

The data obtained allowed a series of analyses, from the level of individual answers provided to the overall questionnaires and interviews.

The analysis of the complexity, together with the weighting, could explain why companies that initially reflect a type of situation (based only on the detection of the items) may later depict a significantly different situation (following an analysis with a complex approach), as shown in Figs. 18 and 19 (The letters 'P', 'M', and 'G', denoting the size of the company, correspond to "Small", "Medium" and "Large", respectively).

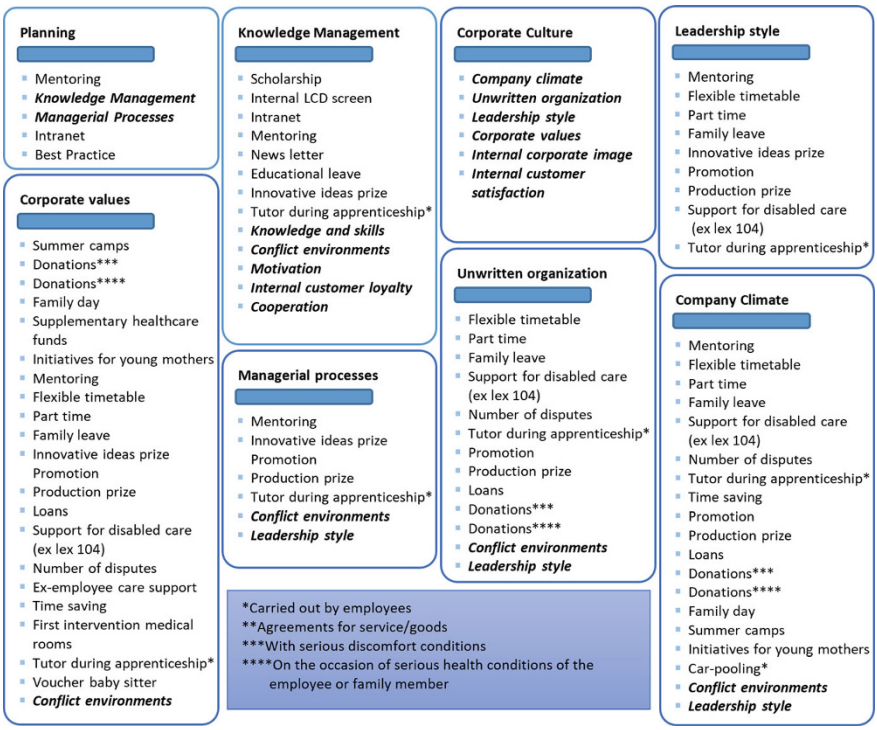


Fig. 16 Organisational capital items and intermediate variables (Source: Authors' personal work)

The first graph shows the average of positive responses for each company, while the second represents the intangibles (understood as the sum of the three assets) as a result of the weighting. The following factors guided the allocation of weights:

- The nature of the items, which were subdivided into items derived from elements, defined by law, defined by contracts, or discretionary;
- The type of intangible assets referred to by the items; and
- The dimensions of the company.

Thus, for example, if an item referring to an element regulated by law had shown a non-positive value, the weight associated to it would have been negative too, but, due to a greater perceived unjustifiability in the case of larger companies, the weighted value would have been further aggravated. Moreover, all the items condition the different assets differently, and the weight incorporates these different values. The difference in contributions of the items to the respective assets is related to the relevance and importance that the concept captured by the item is assigned in the individual assets.

The reason for attributing both positive and negative values to weights is that it is important to detect the state of intangible capital while trying to identify the actual situation, and to dismiss the idea that the value of an intangible not considered, or

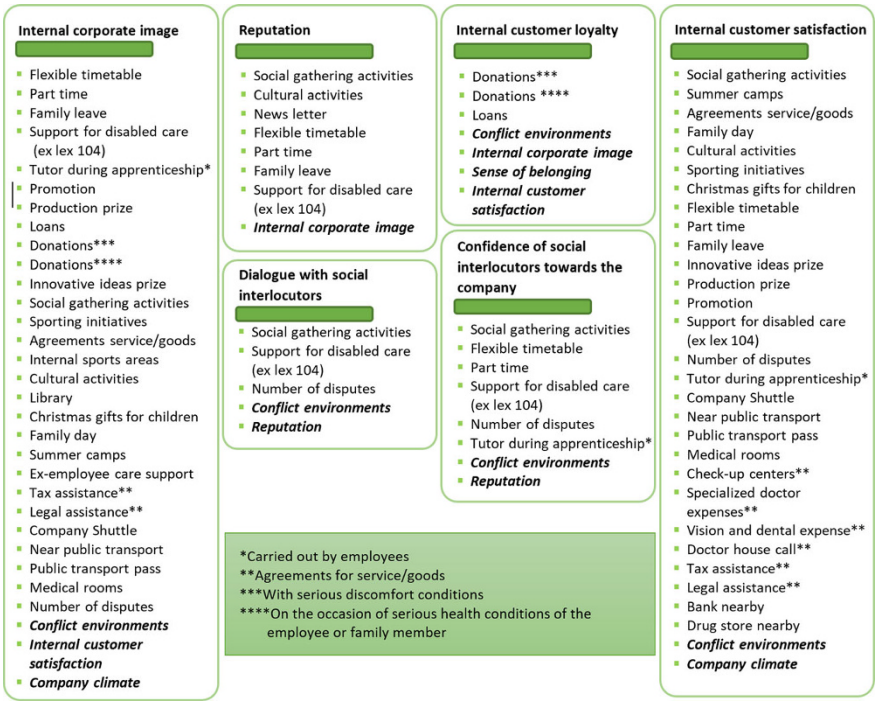


Fig. 17 Item and intermediate variables relational capital (Source: Authors' personal work)

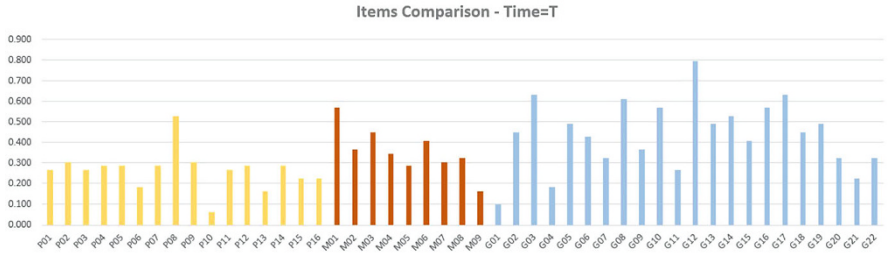


Fig. 18 Comparison of companies based on questionnaire items (Source: Authors' personal work)

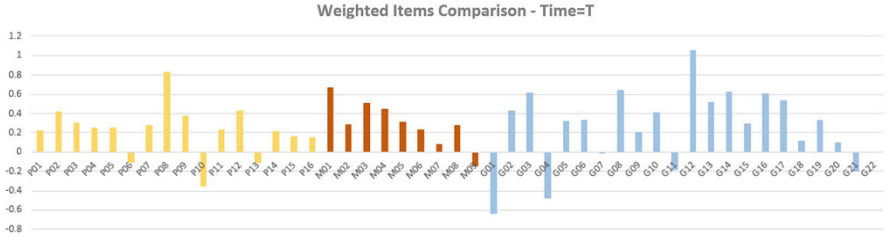
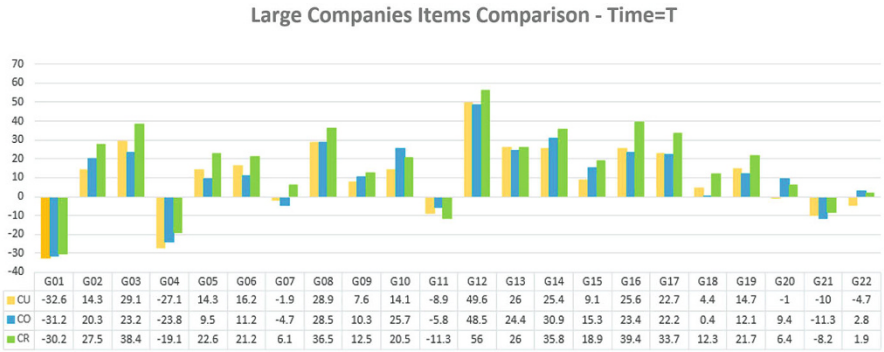


Fig. 19 Comparison of companies based on weighted items (Source: Authors' personal work)



	G01	G02	G03	G04	G05	G06	G07	G08	G09	G10	G11	G12	G13	G14	G15	G16	G17	G18	G19	G20	G21	G22
CU	-32.6	14.3	29.1	-27.1	14.3	16.2	-1.9	28.9	7.6	14.1	-8.9	49.6	26	25.4	9.1	25.6	22.7	4.4	14.7	-1	-10	-4.7
CO	-31.2	20.3	23.2	-23.8	9.5	11.2	-4.7	28.5	10.3	25.7	-5.8	48.5	24.4	30.9	15.3	23.4	22.2	0.4	12.1	9.4	-11.3	2.8
CR	-30.2	27.5	38.4	-19.1	22.6	21.2	6.1	36.5	12.5	20.5	-11.3	56	26	35.8	18.9	39.4	33.7	12.3	21.7	6.4	-8.2	1.9

Fig. 20 Level of intangible assets of large companies (Source: Authors' personal work)

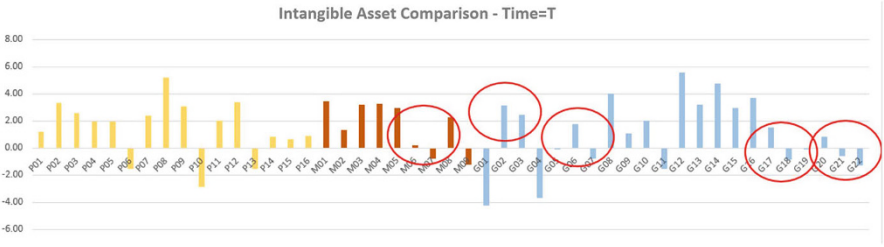


Fig. 21 Comparison of companies based on intangible goods (Source: Authors' personal work)

treated only on some aspects, is null or close to zero. Negative values allows us to understand the gap to be filled and to focus on corrective actions, coherence of the approach, transparency of actions, and time needed to correct the situation. It is noteworthy how the data on to the single asset make it possible to understand which aspects are to be privileged considering the actions aimed at improving the intangible dimension.

For this purpose, as an example, below is a graph showing the effect of the items weighted on the individual assets (this is shown for each examined large company) (Fig. 20).

From this graph, we can determine the contribution of each asset to the global value. It is interesting to note how particular situations emerge with assets that display opposite movement directions within companies, a sign of actions that are not entirely consistent. The examples of G22, G07, and G20 help understand better the results of the graph, and allow us to evaluate which actions, and in which areas, are needed to change the situation.

The relationships between the different variables change the scenario previously observed, as shown in Fig. 21.

The graph above might seem quite similar to the graph in Fig. 19, but the circled points show significant differences between the two approaches.

The situation has definitely changed, and although the companies which are "best in class" do not display substantial changes, some situations show a decisively

attenuated (or worse) condition. Meanwhile, even those business realities that, after a weighted analysis, were at a positive level, eventually showed a trend inversion (e.g. M07, G18, and G19).

5.2 *Complexity Approach for Forecasting Analysis*

A business analysis through a complex approach allows the determination of scenarios with forecast value, in addition to ensuring greater knowledge of the relations in the company. Such a result is possible when the complex model has undergone various tests for consistency and reliability. At this point, it is possible to consider variations and observe how the model can help hypothesise the changes that may occur over time through the modification of the intermediate variables, and, therefore, of the different assets. The effects of the variations will be observed along the paths of the relationships identified.

Time is one of the crucial variables in the analysis, and, like other variables, it is also conditioned by dimensions. In a large company, information spreads slower, resistance to change is greater, common sentiments are more fragmented, and the assumption of responsibility is more vague, than in a small company. All these elements can slow down the reactivity of the whole system. It follows that, depending on the company's size, there will be different growth (or degrowth) rates at the same time: slower for large companies and faster for small ones.

Figure 22 shows the extent of the phenomenon described above. Assuming that all actions and feedback remain identical between periods, small companies show higher growth and decrease rates than large companies do. In fact, the company P08, which, at the time N, was ranked second among the "best in class", overtook G12 at the time N+1 and was positioned in the first place; meanwhile, in the opposite direction, P10 reached the level of G01.

Some examples may clarify the details as well as the usefulness of predictive analysis (or forecast analysis) supported by the theory of complexity.

Our analysis allows, through the model built on the items derived from their answers, the study of future theoretical scenarios, starting from individual actions on different items (also known as a "what-if analysis").

Fig. 22 Comparison of companies based on intangible goods at time N+1 (Source: Authors' personal work)

6 Conclusions, Implications, and Further Research

Companies are complex entities, composed of innumerable elements. Hundreds of relationships exist among these elements: after being founded, they grow, evolve, and transform every day through mutations, even within the company itself (Rosenhead 1998; McElroy 2000; Mason 2007; Morin 2011). These relationships are the basis of intangible assets and determine their value.

These elements cannot be studied without a careful analysis of reality. For this reason, it is necessary to collect as much data as possible through various methods and with appropriate tools, such as analysis of the company's history, interviews, questionnaires, reputation studies, climate analysis, and others.

In order to answer to the RQ, the model, proposed after a survey of companies, facilitates the creation of a scheme that could enhance their knowledge of their present situation, past work, and possible consequences of future actions. The actions of companies, constrained by possible contingencies of their own and the constant urgency demanded by the market, leads to them facing the difficult situation of carrying out internal interventions without being able to consider the various variables involved (Giammarco et al. 2015). This increases their risk of making an error that can nullify the most strenuous efforts: the inconsistency of their work.

In this sense, the model is a management tool that, as in the famous chart designed by Sveiby in 2010 (Osinski et al. 2017), classifies different models of intangibles revised for the present analysis, and it could position itself on the left quadrants, as it would be characterised by a non-monetary component and a decidedly qualitative approach (Fig. 23).

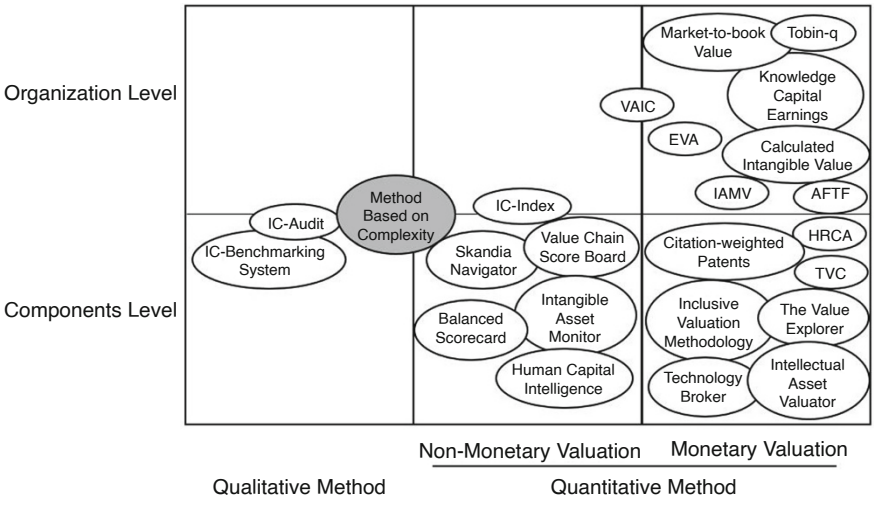


Fig. 23 Intangible asset measuring models, seen by the authors for the present research (Source: Figure created by Sveiby (2010) but modified for this research)

In addition to showing how such an approach can help in the assessment of intangibles, our analysis has also demonstrated the applicability of the model in all environments, be it profit, public, or non-profit companies.

The findings open up interesting avenues for future researches. In fact, the peculiarity of this research, motivated by the need for this required confidentiality, did not allow us to fully investigate the relational capital asset. Moreover, the complex approach can be used for analysis of companies' individual assets, both for in-depth understanding as well as to expand their scope to the external world and the disturbances originating in it. So far, the complexity approach has been used to analyse the actions and behaviours within the organisation itself, but all companies are located in an environment which can condition them (to a greater extent) and which they can influence too (to a lesser extent). The intangibles and the intermediate variables cannot escape the relationships that originate in the external world and which, from the company, move outwards.

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The study of the Theory of Complexity allowed him to highlight the limits of organizational management, underlining the need to overcome the value of the "numbers" present in a balance sheet and specifying the limits linked to their measurement. The work experience has allowed him a greater knowledge and a deepening of the business realities, focusing the attention on the management strategies. The work carried out in both the theoretical and applicative fields allowed him to achieve the certification as a trainer. He has continued over the years to deal with intangible assets as part of the research team led by prof. Lazzarini (University of Turin) with field surveys, and, through debates within the team and with entrepreneurs and personnel managers, was able to broaden his reflections and knowledge on the subject of intangibles as complex elements.

He wrote several publications on intangible assets and Theory of Complexity, he taught in seminars and courses at the University of Economics of Turin. He lives in Turin with his wife, Anna, and their two daughters.

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