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Mapping Organisational Complexity: A Network-Based Approach to Behaviour through Machine Learning Tools

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1. Scenario

The challenge for people and organisations today is dealing with complexity and learning how to accept change and face uncertainty by changing from a deterministic approach to an adaptive and developmental approach. This is a very difficult challenge because it means dealing with phenomena, environments, and organisations that are made up of many interconnected and dependent variables. We are confronted with non-linear systems, which are neither repeatable nor predictable.

The aim of this article is to share information about a research approach to reading organisational complexity, trying to understand how people act within organisations, what guides their actions and how they are interconnected. To do this we deal with a wide range of topics, from work psychology to deep learning, using a systemic and multidisciplinary approach.

The view of complexity as an interconnection between a wide range of variables has been significantly highlighted by the COVID-19 pandemic. For example, Morin argues that the radical novelty of COVID-19 lies in the fact that it has been the source of a mega-crisis, made up of all the overlapping political, economic, social, ecological, national, and planet-wide crises. It is made up of multiple interconnected components, interactions, and uncertainties. In a word, it is "complex", in the original sense of the word, which comes from the Latin *complexus*, i.e., “woven or twisted together”. The pandemic is now seen as an exponential accelerator of the dynamic factors and changes taking place at a cultural, economic, social, and organisational level[1].

[1] https://www.complexityinstitute.it/wp-content/uploads/La-complessit%C3%A0-di-unepidemia.pdf

Think of digital transformation, big data, smart technology and, more generally, Industry 4.0, the structural transformation that our organisations are undergoing, forcing them out of their isolation in a reticular way, hybridizing into phygital forms[2], redefining their normal and operational conditions at breakneck speed.

All these changes require guidance and orientation from management, to bring the workers on board with the change and to support them along the way. Today, we need to ask some pertinent questions and work out an effective way to help people navigate complex and rapidly changing realities, with their constantly changing roles. In this sense, learning has taken on an important social function, generating continuous adaptation to ever-changing scenarios.

When we started our research, one of our objectives was to create a type of "managerial observatory", learning from experience based on data and real-world managerial projects. This would be an observatory in the field, based as it is on practical application and the needs of customers and individuals. It is also contemporary, as it is driven to respond to and solve problems and challenges within a constantly changing environment. This approach should be aware of the different managerial cultures, and not deal solely with a single model of management. So we started with the questions that the managers asked us during our training and consultancy work: *How can I move forward? How can I interpret such a complex reality? How am I able to make decisions faced with such a reality? How can I make the most of all my resources and connections?*

As for the "managerial question", our goal was to identify a model and a tool that would respond to the need to create development plans for managers, starting from an awareness of how they act within certain contexts, perhaps by mapping their behaviour. We decided to develop a new questionnaire, starting from constructs in the literature and, at the same time, defining a vision for our research.

In choosing this vision, we adopted a binocular perspective and a systemic approach that looks at the relationship between the managers and their environment, in order to maintain a global and comprehensive overview of the way the organisation was operating, instilling meaning into its particular situation and promoting a culture of continuous learning.

Systemic thinking is the correct perspective from which to frame the problems. It looks beyond isolated events, seeking instead to grasp the way they come together and the deep connections that exist between them. Systemic thinking is based on “fluid and circular thinking”.

Each of us is a system that moves within a world of systems. Given this perspective, our focus has been on the analysis of the relationships between cognitive and behavioural assets, on which managerial decisions are based, within the dynamics of an organisation. Operating in an exceptionally complex scenario, managers today have to make quick decisions. Training in this sense requires complex tools, to integrate their knowledge, skills, and behaviours, which must be up to the challenge. It must be flexible, personalized, and up-to-date, providing the means to interpret their actions, to help them follow an effective path of development.

To this end, we have developed a method, a journey, by making observations and listening, that the manager can carry out within their organisation, in their own social field, through a comparison with their managerial activities, mapped and redefined in a way that offers them an interpretation of the managerial behaviours and the main drivers behinds them.

Paying attention to the emerging reality that our route map reveals allows us to explore ways that managers can advance from a superficial understanding of their role to a much deeper one, enabling them to develop a greater individual awareness and plan for the future.

2. Methodology

Our challenge in wanting to build such a route map, to support the thrust within the organisational complexity and facilitate a continuous and rapid evolutionary adaptation of management behaviour, has led us to face a series of methodological choices that are anything but trivial.

To decode and interpret the decisions and actions of human beings immersed in a complex system, it is necessary to describe their behaviour within an organisation and focus attention on the variation in intensity with respect to the current situation they find themselves in.

[2]The Boston Consulting Group clearly outlines a global scenario that sees remote working as a well-established component of a company's organisation, one which has not resulted in any loss of productivity ("What 12,000 Employees Have To Say About the Future of Remote Work ", 2020)

Initially, therefore, we tackled the issue using a linear approach. We identified the behaviours that we were interested in focusing on and built a reference model and tool for mapping them. We studied the relationships between different types of behaviour to arrive at a holistic and reticular overview that would reveal the complexity of the interdependence between them, and between the actions and the context in which they were acted out.

From an epistemological point of view, it is a question of intercepting and identifying, in an analytical and timely way, the various actions, the fundamental nodes of behaviour, in order to arrive at a non-linear and meaningful synthesis of the properties that emerge from the relationships between them. The observer needs to be able to isolate, i.e. break down, each element of the system, analytically describing the indicators, and then inductively reconstruct the dense web of connections and empirical nuances that make it possible to express such organisational complexity.

All this implies the adoption of categories, models, and tools capable of expressing the non-linear logic of human behaviour, to create a "high-resolution image" of the matter under investigation.

2.1 Development of the Management Practices Board model

Our model of managerial behaviours was developed through an in-depth analysis of the world of contemporary management, carried out by a multidisciplinary working group. The working group (advisory board) was made up of representatives from different "worlds": corporate, university, and start-up.

Experts in neural networks, assessment systems, and artificial intelligence, and the worlds of digital tools, marketing, people management, and design, worked together to delineate the most significant managerial behaviours in the current environment and within the web of connections and empirical nuances, which make it possible to control organisational complexity.

This mix, made possible by Mylia's ten years of experience in personnel development in structured and non-structured business situations, and the active involvement of individuals and experts from very diverse backgrounds, made it possible for us to explore a stratified vision of reality and follow a logic of continuous exchange, co-generation of ideas, and co-design.

The study was divided into four phases:

1) Analysis. We focused on understanding what motivates the contemporary manager and what their needs are. A feeling of inadequacy in the face of the current, exceptionally complex, scenario and their desire for guidance, emerged very clearly.
2) Comparison with the literature. Having defined the main characteristics of the manager, we searched the literature for models and constructs that would be useful as reference points for our work. In particular, we focused on: cognitive styles and decision-making processes, interpretive reading skills, motivational styles and relationship dynamics, management skills (the ability to intervene as required), and their psychosocial assessment of the organisation.
3) Development of our model. Starting with the ideas that were more responsive to our needs and integrating them with those that emerged from our experience in the field and the comparison with those of the advisory board, we defined and described the four areas that most accurately interpreted our view of management: mapping, influencing, innovaction, connection (Fig. 2.1).

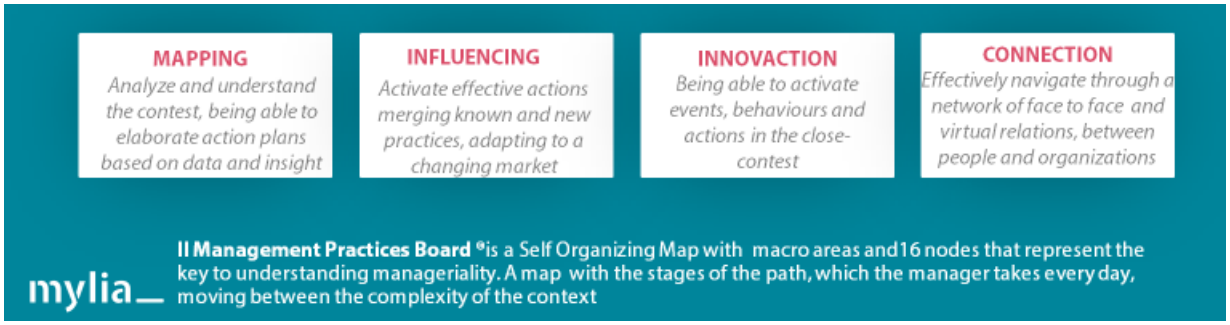

Fig. 2.1

4) Construction of a manager's journey. Starting with the metaphor of the traveller and coherent with the four areas of management on which we were focussed, we designed an iterative and non-linear roadmap, which the manager follows every day by moving between the complexity of their contextual situation and their managerial activities, identifying 16 types of behaviour that most accurately represent this journey (Fig. 2.2).

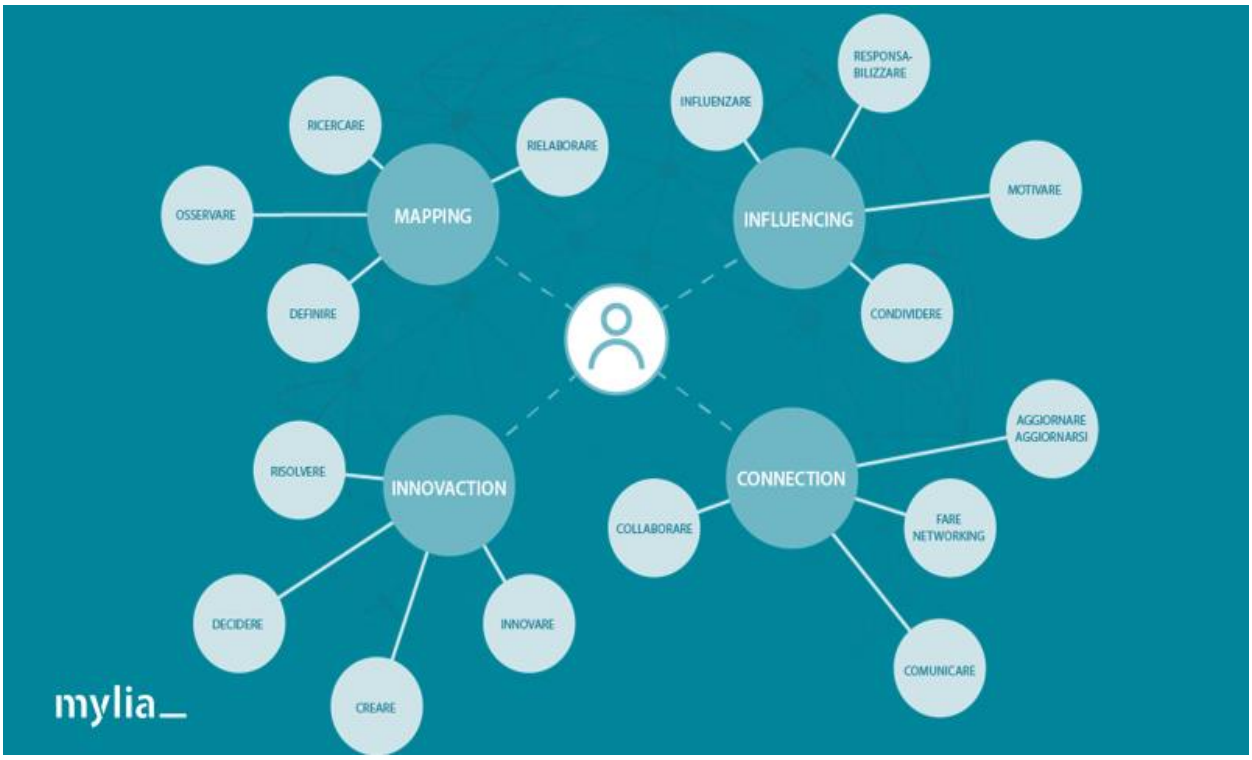

Fig. 2.2

2.2 Development of the Management Practices Board questionnaire

Once the model, with its four areas and its 16 types of behaviour, had been defined, we worked on the questionnaire, which would be sued to map the managers' actions.

Having defined and shared the specificities of each macro-area and each module, we focused on reporting the breakdown of organisational behaviour found in the literature.

To produce the items for the survey for the proposed nodes in the most efficient way, 3/4 behavioural indicators were associated with each of them that would allow the detection of managerial actions.

The items were partially taken from the existing literature using tools that already existed, partially borrowed and modified, and partially created from scratch.

We started with a total of 337 items and asked for the opinion of the Expert Panel, to ascertain the appropriateness of their content. We asked 30 subjects, with the same socio-demographic and experience as the potential recipients of the tool, to give us their opinion on the items under consideration for each module, with respect to how closely they matched the definition. In the second phase, the initial items selected were subjected to a legibility test, to verify the estimate of how comprehensible they would be to the sample population that would presumably be subject to subsequent testing. It was considered appropriate to present all the items to a narrow sample population with a sufficient level of education. Therefore, the group was selected based on their educational level, looking for maximum levels of comprehensibility and linguistic competence for future testing. This sample population was asked to pass judgment on the clarity of each item, to verify the estimate of the comprehensibility of the items themselves. The items chosen based on these criteria were then presented to a sample of 447 people and, by analysing the distribution of each item, it was possible to reduce the number of them still further.

The statistical processing carried out on the dataset was done using the SPSS (Statistical Package for the Social Sciences) software package. Following this phase and the two previous tests to which the items had been subjected, we ended up with a tool composed of 113 items that was then presented to a new sample of subjects.

Once the questionnaire had been completed by the new subjects, the items deemed to be non-discriminatory were eliminated and the scores of the subjects in the 16 nodes were calculated. As each of the nodes was made up of a different number of items, each score on the scale was converted to a maximum of 25.

For each module, the distribution of the subjects in the sample was checked and was found to be nominal, with acceptable degrees of skewness and kurtosis. To choose the three different intervals/ranges of the intensity scales for each behaviour (high, medium, low) some essential elements were monitored:

- the distributions of the sample subjects themselves, to distinguish the tails of the distribution from the groups of compact scores in the central part of the distribution
- the distribution of subjects that fell within the range of the acceptable equivalent percentiles
- the subdivision of scores in which the central range was wide and well-balanced

The distribution of the scores reported in the individual nodes and the ranges identified during the construction phase were re-examined two years after the questionnaire was developed, following a fresh analysis of the factors. With the results of this new analysis, we were able to conclude that the tool is reliable for this type of sample and allows us to describe the subject based on the results obtained from the 16 nodes.

2.3 Reticular model: the observation of a complex view

So far, we have proceeded following a standard method that had been validated in the literature. However, our aim was to experiment with a research path that would give us an accurate picture of, and allow us to represent, organisational complexity and the relationships that characterise it. So, we turned to methodologies and techniques of data analysis from the world of AI, with a background in reticular models.

2.3.1 Methodological requirements of the data analysis model

The first requirement of our model is the need to establish a structural relationship between the various elements of the system. Starting with the measurement of the 104 items in the MPB questionnaire, corresponding to an equal number of observable indicators, it is possible to derive the dynamic profile among the 16 types of behaviour. The structural relationship is not predetermined (except hypothetically) and is the product of a process of progressive inductive clustering, according to the principle of empirical adequacy. In this sense, to grasp the relationships that emerge from complex systems means, in our opinion, to use an exploratory paradigm, rather than a confirmation of theoretical hypotheses and, therefore, to acquire evidence initially from the data mapped in the organisations.

The second requirement involves the application of a reticular approach, thanks to which the logical architecture of the model is defined: each element of the system is not the result of a simple sum of subordinate elements but constitutes the product of a "network" of interconnected observable behaviours. The network is the main category from which we can derive, by increasing degrees of abstraction, all the components of the system. The network, therefore, is the structure in which the relationship between the different types of behaviour takes shape.

The third requirement imposes a topological perspective (also borrowed from the category of the "field"), on the basis of which we believe it is possible to represent the different levels of interconnection between behaviours through a multidimensional map, where the n dimensions correspond to the 16 behaviours in the MPB model. All this translates into a real "geometry" of organisational complexity, capable of expressing in spatial terms the different degrees of intensity of behaviours, as well as the relationships of proximity and distance between the areas and the position of individuals within the map.

2.3.2 SOM and K-means

Which analysis tools can produce a representation that is consistent with the three requirements of the model (an inductive hierarchical relationship, a reticular view, field theory, a topological perspective)? In light of the methodological premises, it was considered appropriate to adopt a method of analysis that integrates two machine-learning algorithms based on the logic of unsupervised learning: the Self Organizing Map (SOM) and K-means.

2.3.2.1. SOM

The SOM is an artificial neural network developed by T. Kohonen (1990) which simulates some brain functions, such as the processing of visual data, to classify large amounts of data through an adaptive transformation of multidimensional input signals into multidimensional topological maps. The objective of a SOM is to identify the structural characteristics and properties underlying the incoming data, without resorting to the analysis of any predicted output, as in the case of supervised learning.

This implies the adoption of a feedforward neural architecture with no intermediate layers, in which the full connection of the outgoing neurons with all the input units and the presence of inhibitory lateral connections is expected. The training takes place utilising a competitive algorithm, whereby the output neurons compete for the "right" to be activated and are "winners" as a function of minimum distance from each input pattern. The final result is a reorganisation of the synaptic weights for an optimal segmentation of the data structure into a discrete number of activation clusters or “bubbles” (Fig. 2.3).

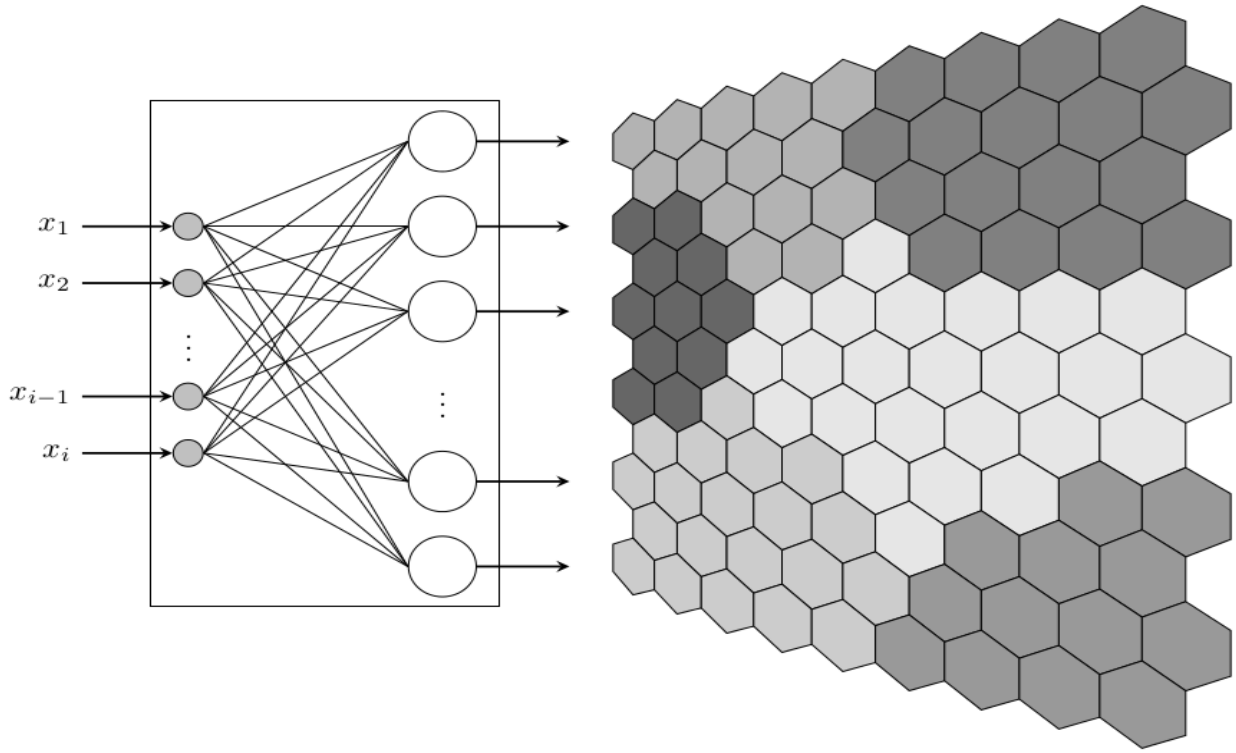

Fig. 2.3

2.3.2.2. K-means

K-means is a machine learning algorithm based on the logic of unsupervised learning. This algorithm is capable of grouping large amounts of data based on the criterion of similarity. Specifically, K-means initially defines a set of K clusters and assigns each “example” (a vector of the dataset) to a cluster to which it belongs. Each cluster includes a finite number of examples, the similarity of which is calculated as a function of the mean distance between them. The cluster is determined by a “centroid” placed at the centre of the n-dimensional space of the n-attributes of each example (Fig. 2.4).

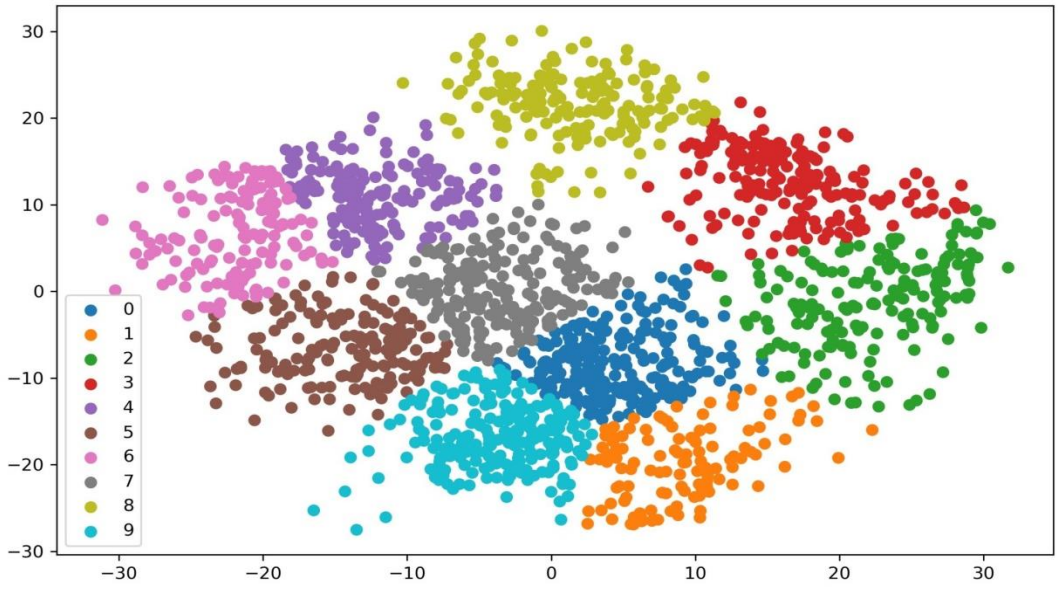

Fig. 2.4

At the beginning of the training phase, the K-means algorithm determines k points (randomly or according to criteria set by the analyst) corresponding to the centre of gravity of potential k clusters. At this point, all examples in the dataset are assigned to the closest cluster (proximity is established using the Euclidean distance rule). K-means then repositions all cluster centroids by finding the mean of all the examples in a cluster. This last operation is repeated until the centroids can no longer be repositioned (or until the maximum number of optimisation steps set by the analyst is reached).

2.3.3 Data analysis process

Data analysis is divided into four phases:

1. Processing the results of the questionnaire
2. SOM design
3. Training and testing the SOM
4. Cluster analysis using K-means

2.3.3.1. Processing the results of the questionnaire

In the first phase of the analysis, the data from the questionnaires are processed using the aforementioned statistical model. In particular, thanks to the matrix that associates each item in the questionnaire with one or more of the managerial behaviours, it is possible to determine the 16-node vector that concisely represents the outcome of asking each of the candidates the 104 questions:

Candidate X = {"Observe", "Research", "Rework", "Define/Design", "Influence" "Empower", "Share", "Motivate", "Decide", "Resolve", "Innovate", "Create", "Collaborate", "Communicate/ Negotiate", "Network", "Update/Self-Update"}

i.e.,

Candidate X = {value of Behaviour_1, value of Behaviour_2, value of Behaviour_3, …, value of Behaviour_16}, where each module can take a value between 0 and 1.

For example:

0.47298 0.50375 0.62234 0.54872 0.34446 0.83310 0.44247 0.76116 0.67846 0.57927 0.61908 0.60576 0.23095 0.52118 0.42314 0.48655

2.3.3.2. SOM design

Once the dataset with the results of the questionnaire has been generated in the form of 16-node vectors - the database that includes the results from the sample population - the data can be uploaded into the SOM Analyzer 1.02 software. Large databases can be loaded into this software for the design, training, and implementation of Self Organizing Maps (or Kohonen Maps).

After uploading the data, the application provides a graphical interface for the analysis of any anomalies and for to accurately configure some fundamental parameters to be used to initialise and train the Kohonen Map (Fig.2.5):

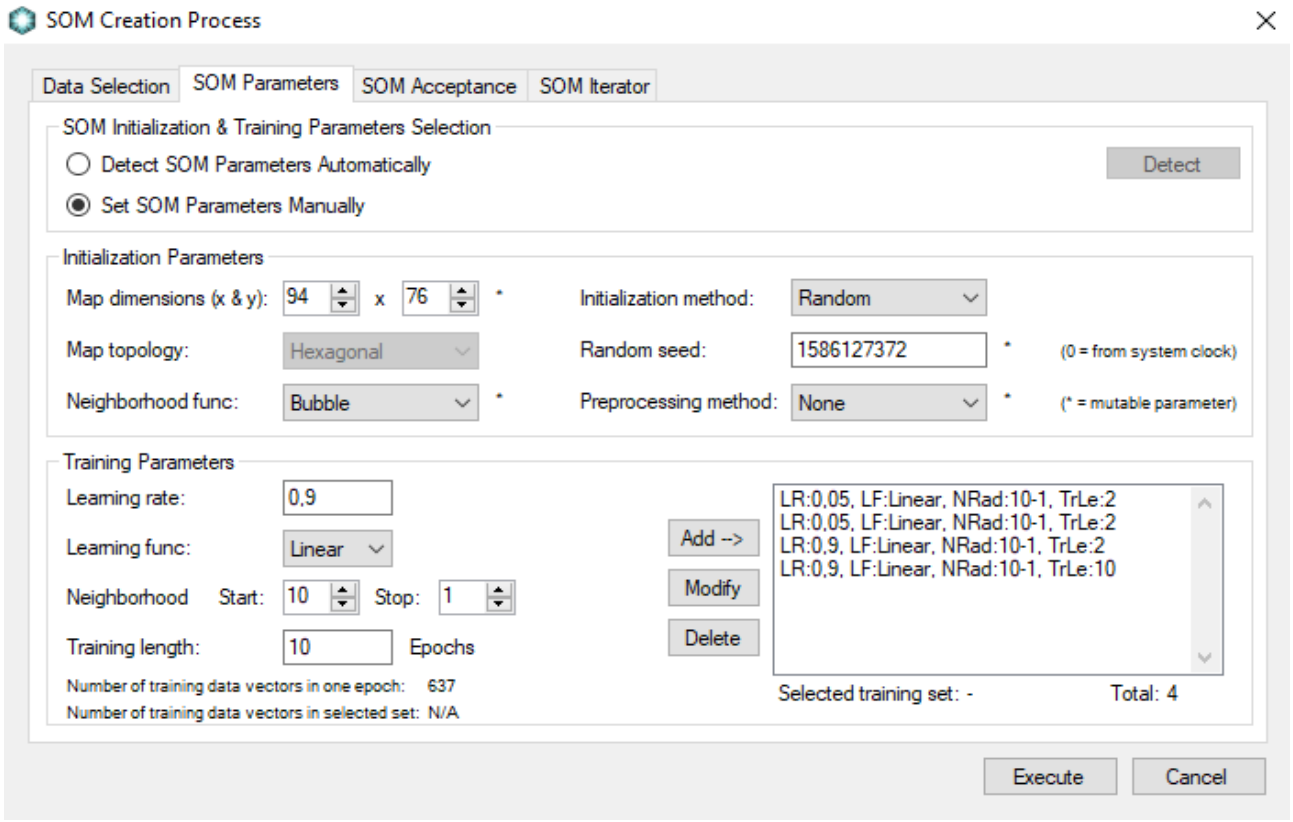

Fig. 2.5

- Initial dimensions of the map (this setting allows you to define the starting "resolution" of the Kohonen map).
- Hexagonal topology of the Map.
- the method for the initial generation of synaptic weights (random or linear)
- the pre-processing method for the input values
- learning rate
- learning function (linear or 1/t).

The next step consists in setting the Acceptance Criteria (reference values to determine the quality of the training) and the SOM iteration control (parameters for managing the training phase) (Fig.2.6):

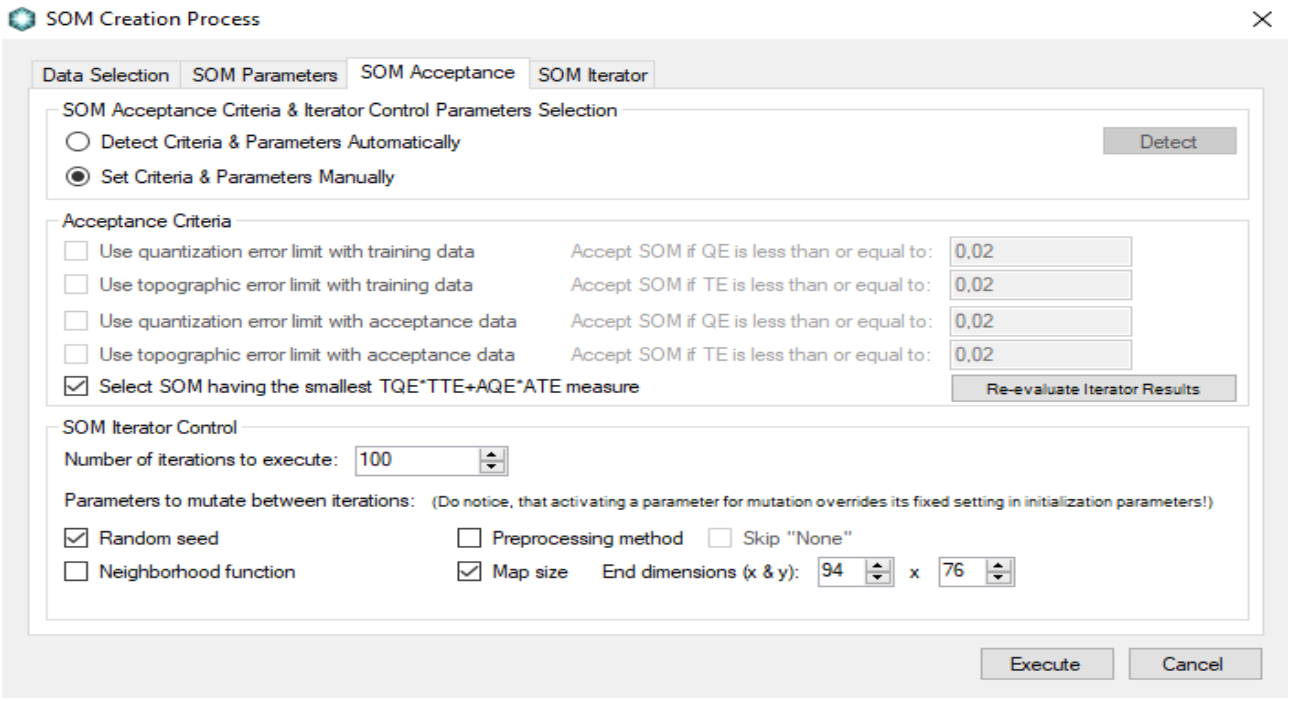

Fig. 2.6

- QE = Quantization Error (calculated based on training data and data for testing)
- TE = Topographic Error (calculated based on training data and data for testing)
- The final dimensions of the Kohonen map.

2.3.3.3. Training and Testing

After configuring the initialisation of the weighting and map training parameters, the actual training can start, using the SOM Iterator function until the Acceptance Criteria have been reached (Fig. 2.7):

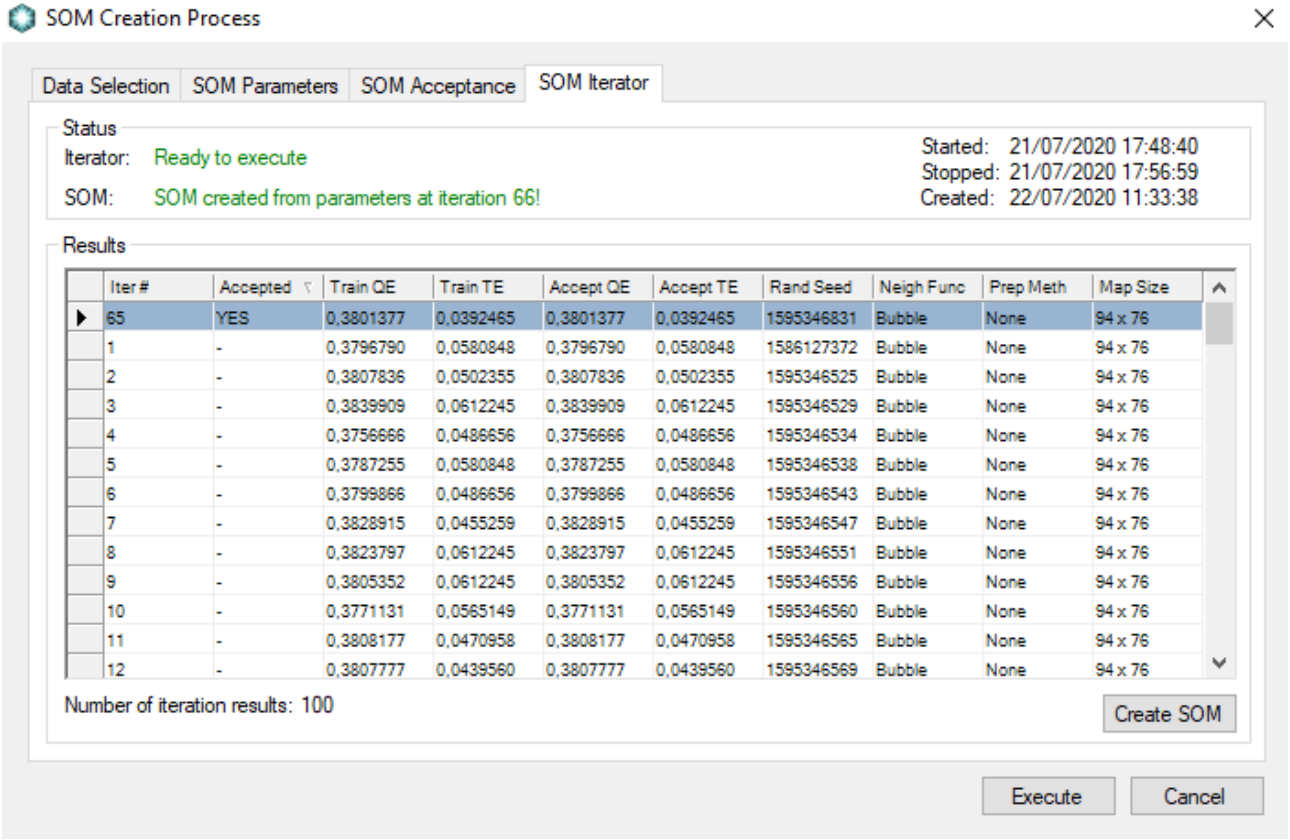

Fig. 2.7

The program allows you to select the map generated for each iteration and create the relative general SOM (Fig.2.8) and the detailed maps that describe the 16components (Fig.2.9):

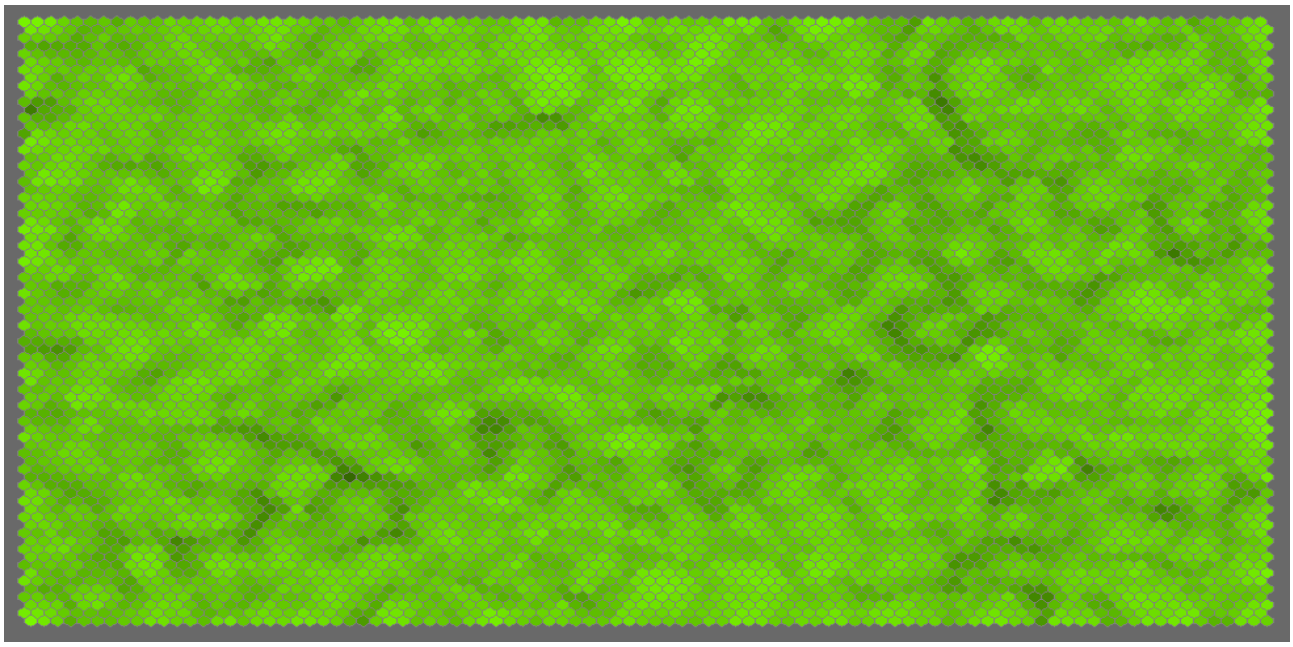

Fig. 2.8

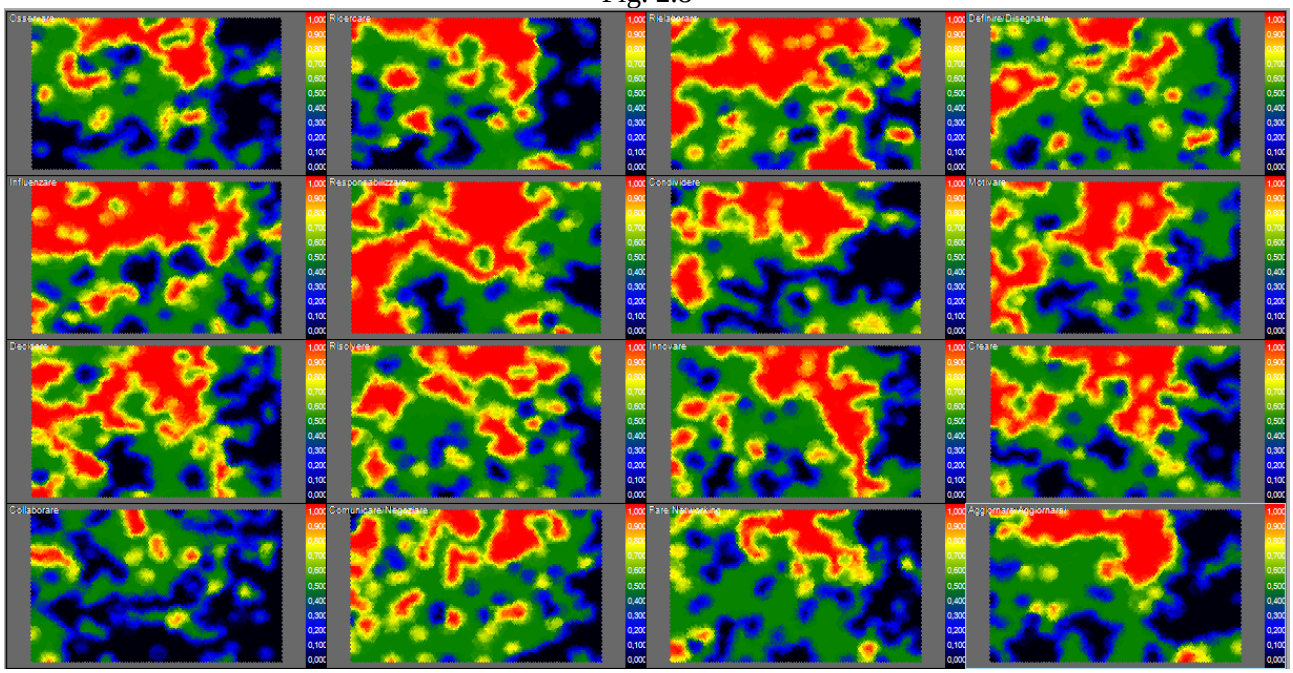

Fig. 2.9

Here are the final features of the Kohonen map selected for our project:

- Map generated from parameters at iteration 66 (total 100)
- Map dimensions: 94 x 76 neurons (7,144 neurons)
- Data dimension: 16
- QE for training data: 0.378754556179047
- TE for training data: 0.0690737813711166
- QE for acceptance data: 0.378754556179047
- TE for acceptance data: 0.0690737813711166

2.3.3.4. Cluster Analysis using K-means

The dataset composed of the 7,144 neurons of the Kohonen Map was processed through the K-means algorithm, with k = 14 (number of expected clusters).

2.3.4. The method of analysis and requirements

The method that involves the integration of the two Machine Learning algorithms - SOM and K-means - turns out to be a satisfactory solution to the problem of data analysis for the mapping of organisational complexity. In particular:

- both machine learning algorithms are based on the logic of unsupervised learning and allow the association of more "examples" from the initial dataset of neurons and/or defined clusters, progressively generating different degrees of abstraction. This property satisfies the first requirement of the need to inductively establish and validate a structural relationship between the elements of the system.
- The reticular architecture of the SOM effectively reflects the relational structure of managerial behaviours through the configuration of a network of points corresponding to the neurons in the map. This feature is consistent with the second requirement relating to the application of a reticular view.
- The Kohonen map represents a multidimensional space within which it is possible to very precisely position managerial profiles and managerial areas and behaviours derived from the aggregation of observable behaviours. Furthermore, each region of this hyperspace contains information showing the different levels of intensity of the variables involved and on the modalities of reciprocal interconnection in terms of their Euclidean distance. These properties satisfy the third requirement of our analysis model, the topological dimension of organisational behaviours.

2.4 Interpretation of the reticular view of organisational behaviour

Machine learning algorithms and, in particular, the choice of unsupervised training have allowed us to build a reticular view of organisational behaviours, i.e., a non-linear logical representation of human behaviour.

The network, therefore, allows us to define the "geometry" of organisational complexity – i.e, the range within which managerial cultures fluctuate - and from here to observe (in spatial terms) the different degrees of intensity of behaviours and the relationships of proximity and distance between them. This observation makes it possible to bring out the distinctive properties of different areas within the map, which become the prototypes for management skills. To observe and understand how these emerging properties are configured over time, it is useful to periodically carry out Kohonen map training. Adding more subjects modifies the maps and allows us to observe, from a longitudinal perspective, how managerial skills change over time, which challenges become a priority, what actions different scenarios require, and how managers respond with the resources they have. This process expands and updates our observatory, and keeps it current.

As the maps show us the results of mathematical processing of the data according to the algorithms chosen, the next step was to identify a method of psychosocial interpretation to organise and make sense of the emerging data, translating it into words and creating an output that could be understood and be potentially useful for the individual being measured. This result was achieved by building a synthesis vision of the relationships between the different behaviours for each person, with the aim of developing knowledge and awareness for the client to help them grow.

We started with the polychromatic Kohonen map, trained using a sample population of 600 Italian managers who participated in our research, resulting in the Mylia map of management skills. This map (Fig. 2.10) is divided into five zones, which describe the five different prototypes of managerial skill (according to the intensity of action of the behaviours that express these skills - following the Mylia model). To orient ourselves on the map we have chosen four cardinal points, four orientations: strategic, implementational, relational, systemic. These orientations help us to read the managerial prototypes that emerge from the Kohonen maps.

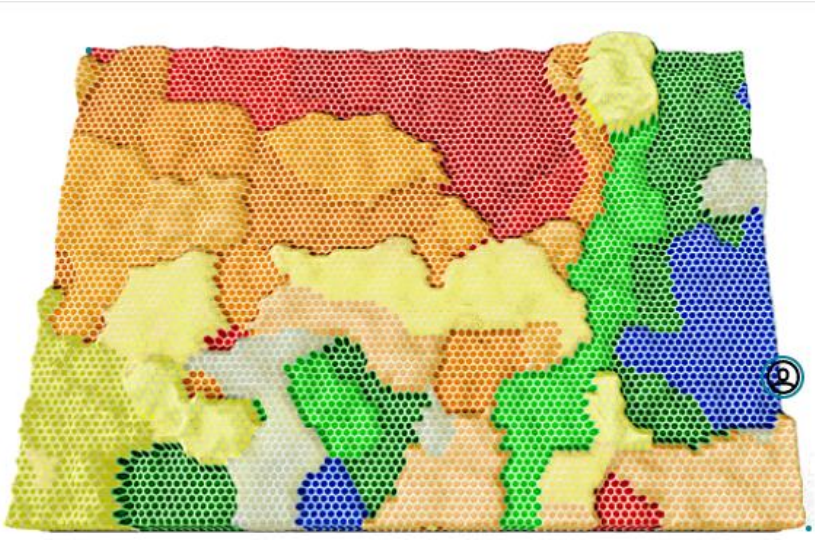

Fig. 2.10

Therefore, the Mylia map of management is a representation of the field within which the person comes to position themselves, with their dynamic profile, after completing the questionnaire. The dynamic MPB profile describes the flow of the person's behaviour, i.e., is an interconnected concatenation of behaviours, according to the Kohonen affinity criterion (Fig.2.11)

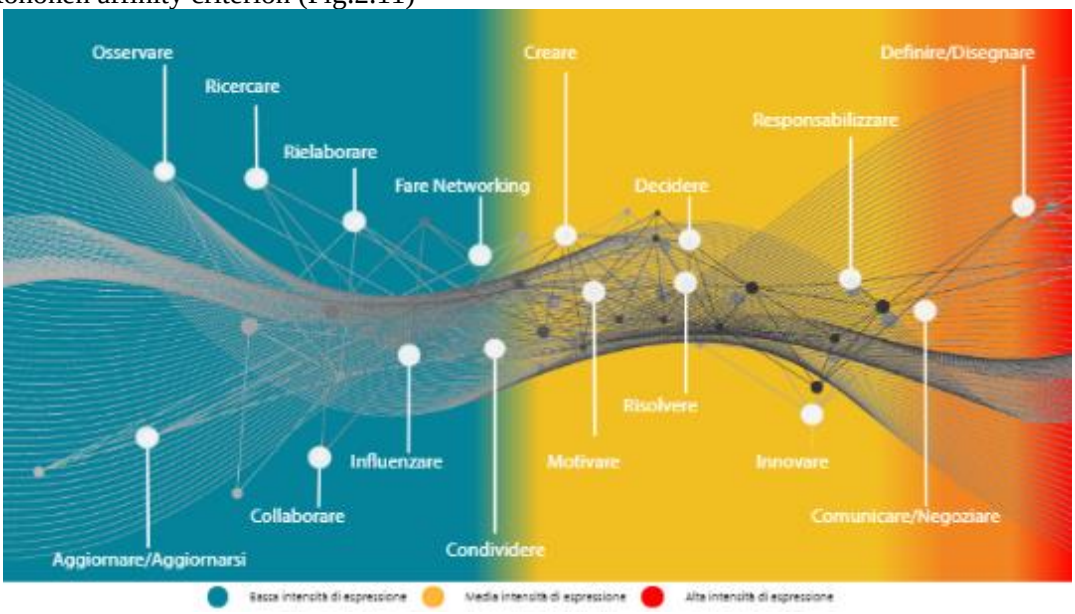

Fig. 2.11

In this way, the linear view of organisational behaviour is replaced by a more detailed view, which allows us to appreciate the complexity of our actions in the real world and to reflect on how all behaviours work together to determine our success.

2.5 Profile reports

A fundamental step was to create a clear and meaningful report, to help the individual involved make sense of the experience and to allow them to apply it to help them grow and learn. An important part of the project was the creation of a report showing the managerial skills snapshot, to help the individual understand the results, become aware of the way they work, and to guide them towards identifying sustainable actions they could take in their daily working life to improve their skills.

These considerations prompted us to develop a different type of report from the classic version of the questionnaire result report, based on four parameters:

- Multimedia
- Interactivity - the individual at the centre
- Simplicity/clarity
- User-friendly

These are all qualities that allow the individual to enjoy the experience, preparatory to their understanding of the data, the internalisation of messages received, and becoming self-aware. We wanted to make the report engaging, friendly, graphically attractive and easy to read, as well as "immersive" for the subject, so we chose to use the travel metaphor.

In the MPB digital report (Fig.2.12), the subject can find both profiles that were produced from the MPB questionnaire:

- The linear profile, which is a result of the classic interpretation of the answers to the questionnaire.
- The dynamic profile obtained from data analysis using the Kohonen algorithm.

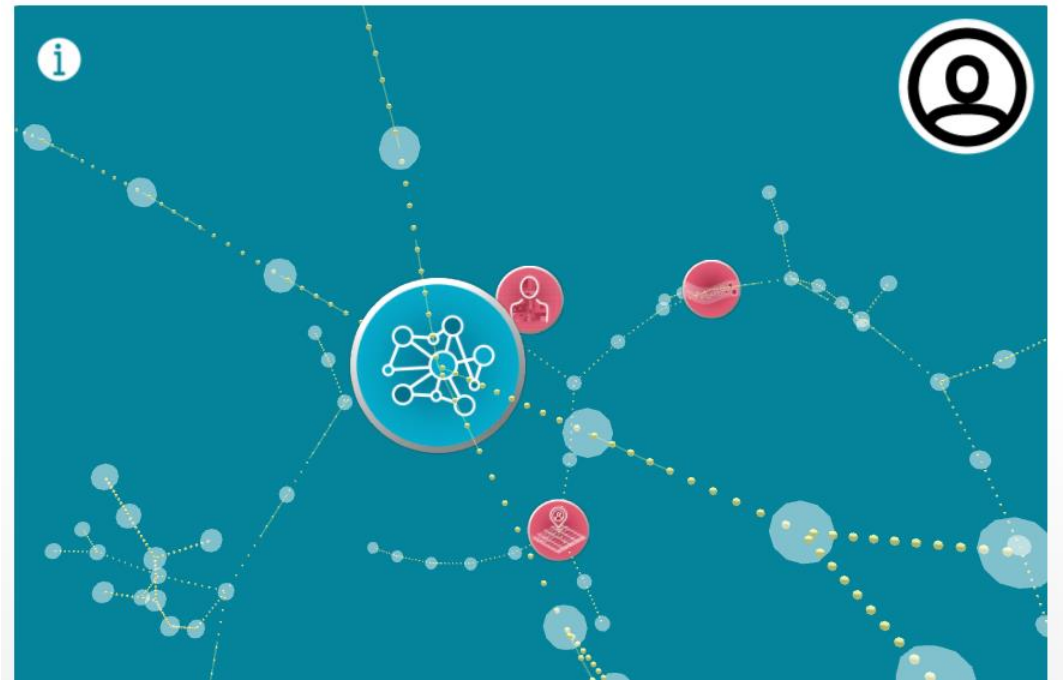

Fig. 2.12

2.6 The discussion of profiles and engagement of the subject

The individual final review

The final review is integral to understanding the subject's profile. It is an important interview, in which the images and linear and dynamic profiles that were produced are shared with the subject. The subject is actively involved. The more they participate and the more information they receive, the more they gain from the experience.

The review guides the subject through a series of steps, which we consider important to give the individual a broader overview of their professional life at this time. This allows the MPB profile to be linked to the context in which the individual operates and to the particular challenges they are facing.

The interview begins with a contextualisation of the framework within which the project is set and the reasons that prompted the client to choose the MPB questionnaire. We then go on to share the objectives of the review, which are to create awareness of the behaviours expressed by the individual in their managerial role and define a development plan starting from the image created from the MPB. For this reason, it is essential to provide an overview of how the MPB managerial model works, and what the four areas and the 16 behaviours represent. It is important to underline that it is not an evaluation questionnaire, i.e., one which assesses the quality of the behaviours of the individual. Rather, it is a tool that allows us to map the actions expressed by the individual in their everyday life that tells where their energies are most concentrated, to understand how much these are in line with their role and the current situation within the organisation. We also reassure them about the confidentiality of the interview. In all phases of the process, from the client interview to the final review, transparency and ethics are integral to the project. We take the time to explain the model, the method used, the roles, and the purposes and scope of data translation to the client. This means maintaining a high level of confidentiality concerning the information provided by the client, respecting the needs and requests they express that are required to meet the agreed objectives.

The heart of the review is centred on the two profiles from the MPB questionnaire: the linear profile and the dynamic profile. This approach allows us to gain a perspective on the individual nodes of behaviour of the MPB model and that of the interconnection between all 16 nodes of behaviour.

How do we achieve that? First of all, let's talk about the Mylia management map, with its 5 different managerial zones or prototypes. We orient ourselves on the map using the 4 cardinal points - strategic, implementation, relational, systemic. Once we understand the logic of the map, we enter the position occupied by the person within the specific zone to which they belong. Here we explore the dynamic MPB profile, through the flow of behaviours, from the most frequent to the least frequent (or vice versa). This interconnected concatenation of behaviours, determined by Kohonen's affinity criterion, allows us to go beyond the linear vision towards a more complex view of our actions. Therefore, in the same way as real-world behaviour is the synthesis of the interaction of a series of internal resources and external inputs, the dynamic flow is the result of the interconnection between all the behaviours expressed by the individual and mapped by the MPB model, within the neural map of managerial skills. This interconnected view gives us a holistic view of behaviour. The vertical view, based on single segments of behaviour, is superseded by a dynamic view, which highlights the multiplicity and contemporaneity of our daily actions. This reflection on the complexity of our actions aims, within the review, to identify the behaviours that have the biggest impact on the role of the individual person, the organisational framework within which they operate, and the major challenges they face. From here, we start to build up a development roadmap, focus attention on the most important items, and prioritise the actions.

The group final review

The group final review is integral to understanding the dynamic group MPB profile and gives us the opportunity to focus on the behaviour of the managerial team of the client organisation, with respect to the current status of their corporate life and future prospects. The discussion of the individual dynamic MPB profile also starts with the Mylia management map, which allows us to position all the members of the management team within it. Based on the 5 zones of management, we can observe the similarities and differences in intensity of the behaviours expressed by the team. The neural representation of Kohonen offers us an interesting perspective from which to read group behaviour, allowing us to observe how people cluster close to each other (similar behaviour) or further away (less similar behaviour). In this way, one or more groupings are created, within the different zones of management. The characteristics of the zone in which individuals are concentrated make it possible to observe their distinctive behaviour and how it differs from groups in other zones. The distinctive characteristics of the zone are determined by the flow of the behaviours of its centroid, which represents the point of reference and guidance for the development of the zone under observation. The flow of the centroid guides the observation of the behaviours of the group of people in that zone and the comparison with the behaviour of the other members of the management team, who have positioned themselves in different zones. It is interesting to compare these observations with the organisational challenges and objectives that the situation requires of management.

Observing the expression of managerial skills within a managerial team is the starting point for identifying the development objectives most consistent with the contextual situation of the organisation and creating a suitable development plan. Our challenge is to create links between all the information contributing to the construction of a holistic view of the behaviour of the management team within the organisation.

In conclusion, we collect feedback to help us improve.

3. Results

Over the last few years, the Management Practices Board has been used in various Mylia customer initiatives, aimed at having an impact on the development of managerial skills within the organisations.

The tool was chosen by companies belonging to the most disparate sectors and of different sizes. A summary can be seen in the chart below (Fig. 3.1), which shows data from the projects carried out involving 2,570 managers.

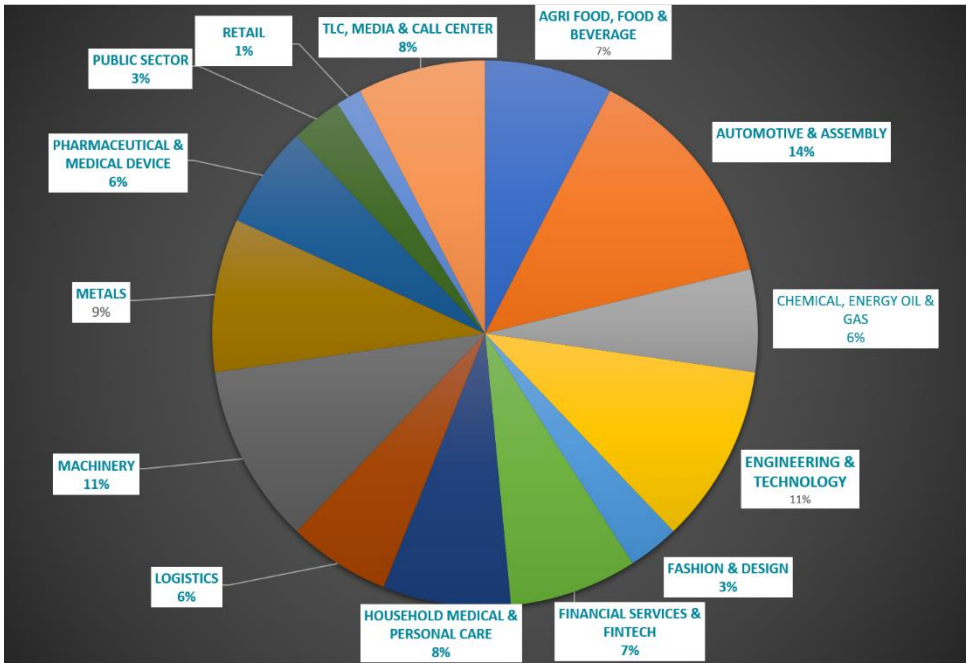

Fig. 3.1

The interesting fact is that MPB has been chosen as a useful tool for defining development programs, where these companies have found themselves facing issues relating to change management or people management, with the aim of improving behaviours, strategies, engagement, and sharing among their managers.

The target figures with whom we have worked in recent years have mainly been middle managers, along with a large number of top managers who have been involved in the mapping processes. These are diverse managerial roles, which have in common the fact that their role is to manage other people. We have worked with managers from large companies who work with hundreds of people, as well as with those from SMEs, who are in charge of small groups.

The objective at the heart of the projects using the MPB, has always been linked to the need to create a path towards the development of awareness within the organisations. An awareness that translates into identifying which managerial styles are present within the organisation, to understand how consistent they are with each other and to identify any peculiarities and specificities.

Starting from this process of developing awareness has ensured a better and more precise definition of the training and development programs that need to be implemented: an important opportunity for the individual and for the organisation that can truly be at the centre of their development path.

Many people were involved in our mapping processes, working in the most diverse fields. If we wanted to try to summarise and discuss the typical situations in which we found ourselves working through the application of the MPB, there would certainly be several issues we'd need to address:

- Recognising internal managerial styles, to understand what kind of homogeneity/inhomogeneity exists within a single managerial team
- Improve the coordination behaviour of managers according to the business objectives, in particular for front-line managers
- Identify a common management and coordination style and develop internal managerial skills starting from this base.
- Understanding the development potential of the management team
- Contributing to the development of the role of new managers, aligning their managerial style

The feedback we have received from the subjects who have had the opportunity to use the MPB is interesting in terms of their recognition of the validity of the tool's support for data analysis, being part of an in-depth study of their circumstances without ever feeling that they were being judged and feeling themselves to be active participants in the development of their own career paths.

Having the opportunity to focus on one's own actions, without highlighting weaknesses or areas of stagnation, was also a new and stimulating perspective for them.

It is also very interesting to see how mapping through MPB has contributed to the definition of development paths in the face of change management challenges and, therefore, how to map the behaviour of the managerial line to identify the levers on which to rely to facilitate the process of change, or even just to understand the situation from which one is starting and therefore, what realistic objectives to set to cope with the management of such a process.

This was the case in a real-world scenario in the Pharma sector, which was experiencing a period of transition, as a result of the management's new, post-pandemic way of working.

Starting from a snapshot of the current state of managerial skills, represented by the Executive Team, made it possible to understand the obstacles and opportunities and, therefore, the aspects on which to focus on the work to be done.

The group was made up of different profiles and, by way of example, below are the profiles of two team members (Fig.3.2) (Fig.3.3):

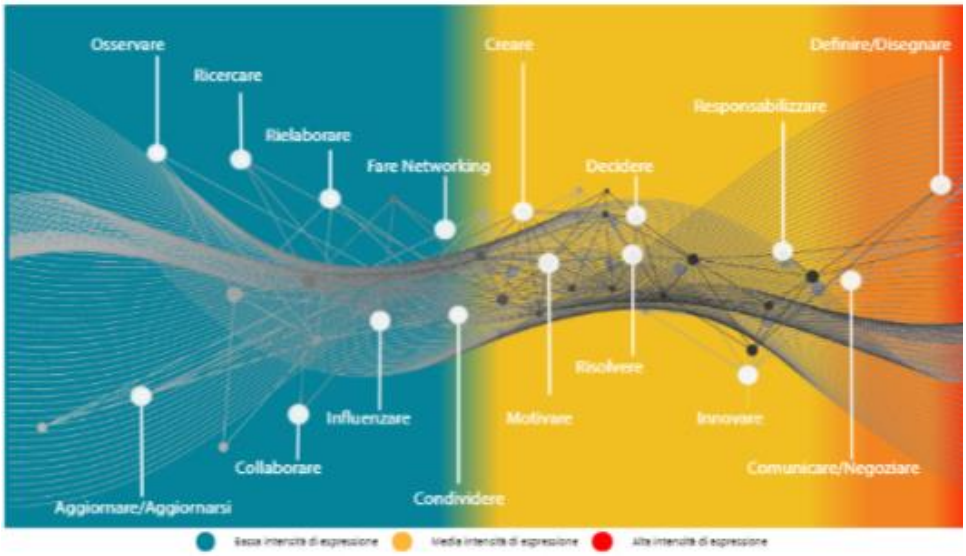

Fig. 3.2

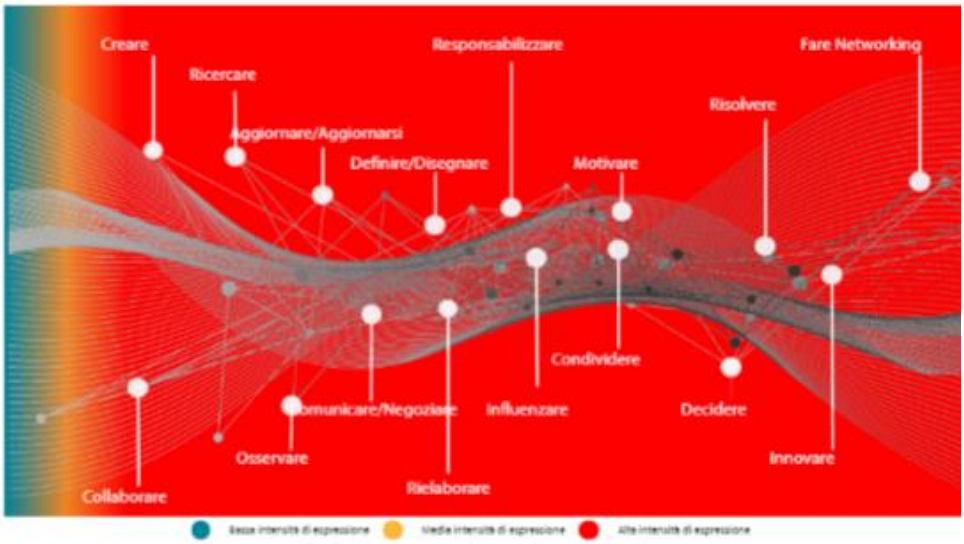

Fig. 3.3

Some of the flows highlighted the propensity to apply one's managerial skills in a dynamic way, with an active and constant presence aimed at building and maintaining relationships on the ground and in those areas that allow change to take place, maintaining constant pressure in one's own area of responsibility. In others, however, there is a greater propensity to apply one's own managerial skills through the definition of strategies and objectives, guiding a group of collaborators towards decision-making.

The mapping (Fig. 3.4) was an opportunity for the group to get to know and recognise each other through their managerial style. This awareness was fundamental to identifying the points on which they needed to focus, pooling the resources of all the team members.

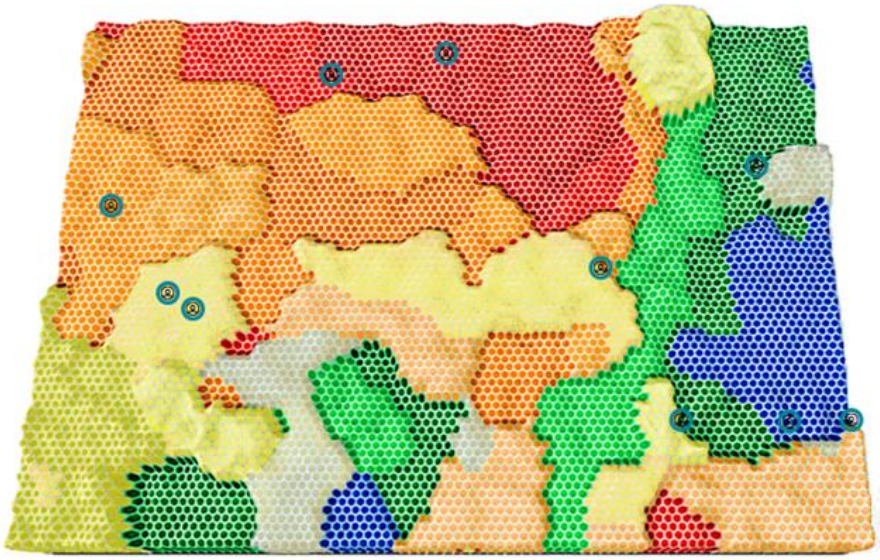

Fig. 3.4

Group map

A unique opportunity to read each other as a group and to identify a common work plan; learning to define collective objectives and recognising how much one's managerial style can influence the reactions of the other team members, but also of one's own collaborators and internal customers; discovering in which areas they were in agreement and those in which different peculiarities emerged.

The mapping was also an opportunity to learn about the behaviours through which the group turned corporate values into real-world actions.

Reading the map allowed us to identify the prevalent behavioural styles, shown in the following images, and the characteristics in common between the various styles (Fig. 3.5).

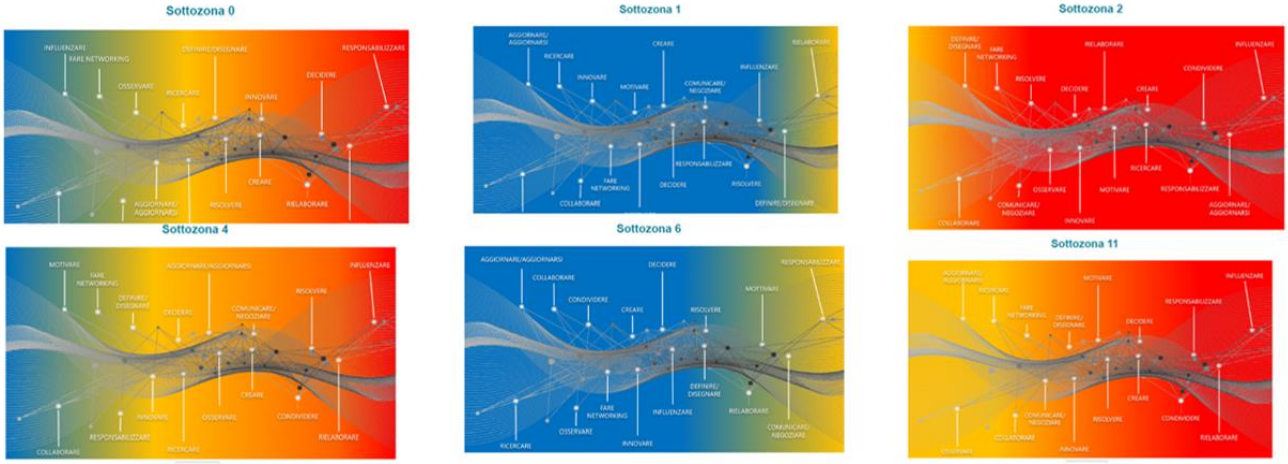

Fig. 3.5

Regardless of the level of intensity reached, each flow is characterised by a very analytical and operational style, with a strong push towards objectives being met. These are very characteristic traits of the team, which is also characterised by an orientation towards problem-solving and notable flexibility and adaptability (Fig. 3.6).

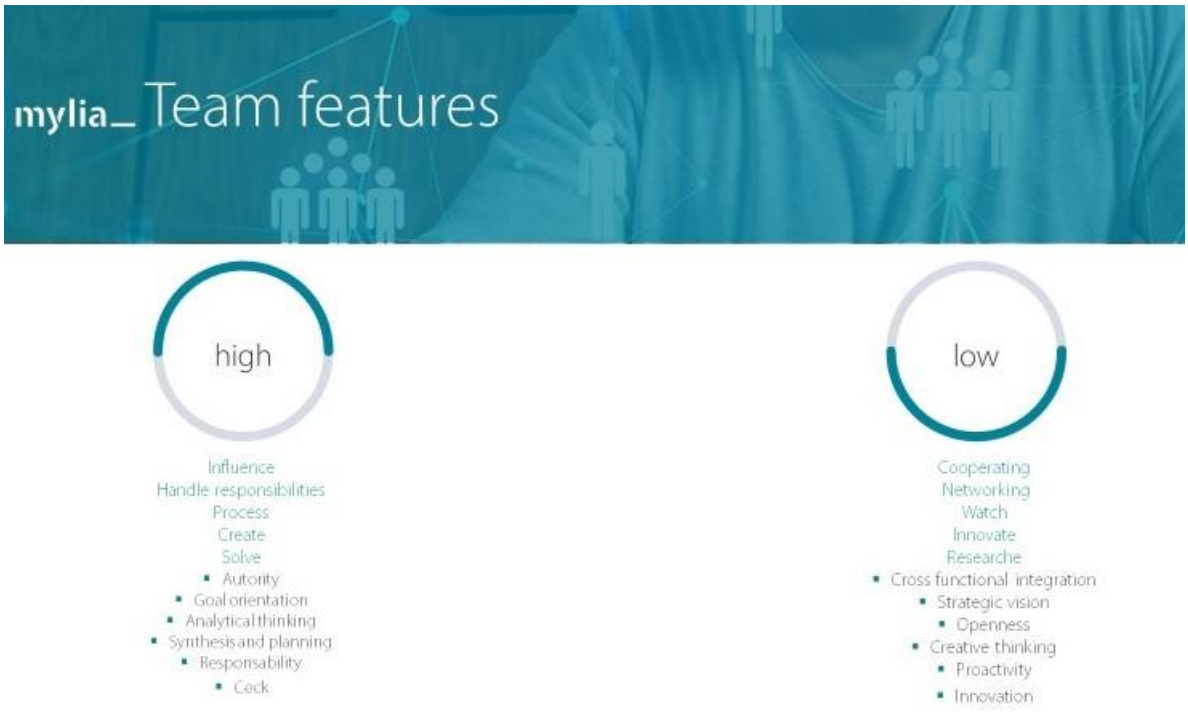

Fig. 3.6

On becoming aware of this, the group responded by initiating a process of internal reflection, supported by a senior coach. This was useful in understanding how to best direct this behavioural thrust and how to exploit it to develop even the aspects that had been less examined.

The discussion was based on the observations that the individual team members had made after their individual reviews, and which they brought into the group discussion, integrating them with the deliberation that the visualisation of team data had provoked.

They tried to identify a series of common practices that they could put in place to "explain" the data that emerged from the mapping, to gain an even better understanding of the data analysis.

This exercise was very useful to allow them to see more clearly the actual mechanisms and rituals that the team unconsciously puts in place and that identifies them as a group. This new awareness helped them make a further comparison, aimed at identifying work priorities, to make the most of their resources. By sharing this information, the team identified some areas which they should work on together:

- The ability to translate the vision to the appropriate resources, with consistency and punctuality.
- The exercise of empowering leadership that understands how to recognise and enhance the talents of human resources, the levers for development, and motivational impulses.
- The ability to develop autonomy over one's own resources, starting with an effective process of delegation.
- The ability to communicate effectively, based on an empathic approach and active listening.
- Innovation understood as the development of a growth mindset and as an active search for innovation.
- The ability to create an internal and external network, as an opportunity for exchange and sharing, but also for updating and generating innovation.

Using these focal points, the group, independently and moving beyond the narrow vision of its own profile and needs, came up with an order of priorities for a team development path. The choice of priorities was made by inviting individuals to reflect on what they felt were the most urgent points on which to focus, but that would also be less expensive to implement and, therefore, have an immediate and positive impact on their business. The choice was mostly based on those aspects (the first three) that focused on behaviours that were more usual and habitual for them, which only had to be improved or expanded, leaving aside those that covered areas less familiar to the team and on which a lot more effort would have had to be expended.

4. Conclusions

In the years that we have used MPB mapping we have learned that, in general, it goes far beyond providing a single data point on a single manager and can be a very interesting study of the expressions that characterise the whole organisation. It provides an understanding of the prevailing culture, the behaviours that are somehow more recognised or less recognised, enabled or not enabled, the managerial style of the individual according to their specific role, their situation, the demands placed upon them, and the historical context, both in their role as a manager and as a member of a work team and part of an organisation with specific business objectives.

This interpretation, totally guided by an increasingly data-driven approach, i.e., an analysis of what the data brings to light, has also contributed to a better understanding of relationships between behaviours and the constantly evolving business situation, making it easier to interpret organisational complexity.

At this point in our research, we feel the need to continue to explore these relationships more and more deeply and to try to develop a causal model between behaviours, which can increase the understanding of the dynamic interaction between them, and that can contribute to helping to predict the best development path for the individual.

To make this exploration even more thorough, we are considering including two new points of observation in our research:

- The inclusion of professions other than just the managerial one covered in the analysis.
- Recognising the fundamental role that the individual's engagement and passion for what they do plays and, therefore, trying to add an emotional aspect to the interpretation.

In conclusion, our research has shown us how much continuous change is the only certain variable in organisations and how difficult it is to translate what is declared by companies in their value/skill models into concrete action. There is almost always a disconnect between what these models predict and what people actually do. We will continue our exploration of this topic and continue to be guided by the recognition that businesses are in a state of continuous change, and by the search for tools and data that can give us an increasingly "contemporary" and real-world view of what happens in organisations.

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