

What are the Drivers of Competence Management?

Lisa Gaudens^{1,2}, Muriel Davies² and Stéphanie Buisine²

¹EDF, DPN, DRHM, Paris, France

²CESI, LINEACT, Nanterre, France

lisa.gaudens@edf.fr

mdavies@cesi.fr

sbuisine@cesi.fr

Abstract: Globalization and technological transformations emphasize the need for developing new skills and acting at the peak of one's capacities. Competence is defined as the combination of external and individual resources to fulfill one's job demands and contribute to the organization's purpose. It corresponds to feeling effective and efficient in one's actions. As such, competence is one of the basic psychological needs, according to self-determination theory. In this paper we focus on diagnosing the drivers of competence in order to implement transformations in a specific organization to improve the use of existing resources, stimulate the development of skills and increase performance. The study was conducted in a major French company from the energy sector. We re-analyzed the corpus of an annual survey gathering the perception of about 11,000 respondents representing all job categories and all hierarchical levels. We conducted a Principal Component Analysis followed by multiple regressions in order to identify the predictors of feeling competent. The first analysis shows that the data could be summarized in 5 key indicators: 1. Involvement and trust in the unit, 2. Team management, 3. Meaningfulness at work, 4. Working conditions, 5. Organization and cooperation. We observed that the item addressing the feeling of competence showed high correlation with the third dimension related to meaningfulness, which further highlights the importance of competence for self-accomplishment. The next step was to search for the drivers of feeling competent in several job categories. The results show that production and maintenance exhibit very different profiles. The only common driver appears to be the role of the manager in developing employee's skills. For production employees, feeling competent is mainly linked to external resources (unit organization and social identification) whereas for maintenance employees, feeling competent rather depends on individual resources (work content, professional development). Beyond the design of custom interventions based on the specific needs of each job category, this study emphasizes that there is no unique solution for managing competence and that the key to performance and fulfilment should be found in careful analysis of the organization and its members.

Keywords: Competence management, Knowledge, Self determination

1. State of the art

1.1 Competence Management

Companies evolve in a moving, connected and constantly changing environment. Whatever the origin of these changes (economic, legal, social), they have a profound impact on the organization and content of work and, in fine, on the skills of individuals. In this changing environment, competitiveness relies on the oldest asset: human capital. Thus, advancing employees by moving from a logic of training to a logic of competence has become a real challenge to be met, because competence plays an essential role in the performance of companies.

There is no universal definition of competence. It is a polysemous notion, an object difficult to define, used in different fields: psychology, social sciences, education and training, law (Le Boterf, 2002). Even if there is no consensus on the definition of the notion of competence, there are however two dimensions that emerge in these definitions: The cognitive dimension with the triangle of knowledge, know-how, interpersonal skills; and the social dimension with the combination of knowledge, skills, attitudes.

Guy Le Boterf (2018), by modelling competence as a process, brings a new perspective gathering these two dimensions. For him, competence is based on a dual conception between being competent and having skills. To be competent is to have the capacity to act with relevance in a professional situation by mobilizing "an appropriate combination of resources (knowledge, know-how, behavior...)". Whereas having skills means having the combination of resources to "act with skills". For Le Boterf (2002), what distinguishes people at work is the "know how to act" in a sustainable way: that is to say their ability to mobilize their knowledge and reinvest it in a relevant and sustainable way in situations. In his vision, competence is not an addition but a combination of resources.

Fernagu (2018) also offers an interesting vision, defining competence as the result of the articulation of internal and external resources that cannot be thought of outside of the contexts and situations in which they take shape. In this view, skills derive from the existing link between the individual and the organization, and are "complex and dynamic" units that cannot be developed. Also, talking about the development of skills would result in an

abuse of language, since it is not possible to think of the development of something that disappears as soon as it is put into practice. Nevertheless, what is developed is knowledge and learnings related to the resources of the individual and those of the environment (Fernagu-Oudet, 2018). Skills thus result from the relationship between the individual and the organization, and it seems fundamental to study the nature of this link in order to consider developing them. We choose to adopt this definition for our research because it highlights the organization-individual interdependence which seems fundamental to us in the development of competence.

Guy Le Boterf (2008) defined a competence model based on 3 pillars: knowing, being able, and wanting to act:

- Knowing how to act: These are the means that make it possible to acquire the resources to act (knowledge, behavior, emotional resources). We can characterize this as the internal resources mobilized by the individual.
- The power to act: this includes the organizational context and the means that make it possible to implement a practice in a relevant way. We can characterize this as the external resources allowing the individual to act.
- The will to act: This implies the motivation of the employee to develop her/his professional practice, to acquire and mobilize resources.

These three elements must be brought together for employees to act as competent professionals. In addition, acting as a competent professional is a responsibility shared between the individual and his/her peers, his/her manager and the organization in which s/he is located (Fernagu-Oudet, 2018). For Fernagu-Oudet (2018) three dominant relationships stand out in the practice of competent action:

- The knowing subject: here the skills are considered as strictly individual attributes, decomposable and juxtaposable (knowledge, know-how, life skills).
- The acting subject: here there is no skill outside of the situations in which they are implemented. The individual adapts to situations according to the resources at her/his disposal.
- The reacting subject: here there is a dialectic between the individual and the environment in which s/he acts. Individual resources should be articulated with those of the environment in which it is embedded.

1.2 From Knowledge to Competence

The learning processes that lead to competence are still largely unknown. However, a few concepts help us understand more how it works. According to Singley and Anderson (1989), to make a transfer, learners must encounter similarities and differences between tasks, build mental patterns of relationships between the two tasks and establish a recontextualization transfer. In a transfer situation, the integration process takes place by mobilizing knowledge, skills and attitudes.

Three mechanisms (Figure 1) make it possible to understand the process of integrating knowledge with competence in the professional context. Some authors rely on transfer research to explain the integration process that makes us apply or not what we have learned. Transfer is defined by the ability to learn under new conditions by mobilizing existing knowledge and skills to perform a new task (Gick & Holyoak, 1983).

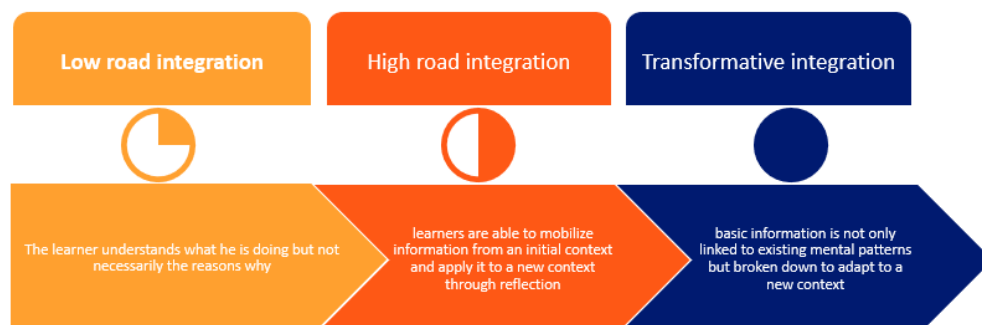


Figure 1: From knowledge to competence

Low road integration

It's the first form of integration that occurs automatically. The learner understands what s/he is doing but not necessarily the reasons why s/he is doing it, the learner is not able to understand why the task is performed in this way in a particular context. This first form usually occurs automatically as a result of a performance: a new

task that shares characteristics with previous tasks automatically triggers the required knowledge that is then transferred to a new task (Baartman & De Bruijn, 2011; Boshuizen et al., 2003). Boshuizen et al. (2003) describe how professionals develop from novice to expert via the encapsulation of knowledge that allows them to create links between concepts and thus accelerate the integration process.

High road integration

This is the second form of integration where reflection is mobilized. According to Schön (1983), the integration of knowledge to become a skill requires reflection on action in addition to practice. In this form of integration, learners are able to mobilize information from an initial context and apply it to a new context. The transition from knowledge to competence is done here through reflection, the learner must become aware of what s/he is doing. More specifically, learners think about a task, rely on existing knowledge and skills and build new mental patterns that allow them to perform a new task, this is called the assimilation process (Piaget, 1970). In summary, in this model, learners must identify what is necessary to do to carry out the task, thinking and action are combined to create new skills.

Transformative integration

The third mechanism that intervenes in the process of integrating knowledge into competence is what is called revision or accommodation (Baartman and De Bruijn, 2011). In this model, basic information is not only linked to existing mental patterns but broken down to adapt to a new context. This happens, for example, when there are dissonances between the new information received and the knowledge already acquired. This third form of integration also involves self-reflection, the learner's ability to conduct a critical reflection on what s/he is able to do. This involves cognitive, social and emotional changes that can transform the learner's identity (Baartman and De Bruijn, 2011). The different integration processes take place during the execution of tasks, which allows the formation of new skills.

1.3 Self Determination Theory

For a long time, motivation was seen as only extrinsic, especially in the field of Human Resources. Deci and Ryan's theory allows us to approach motivation from a new angle. It is no longer a question of how to motivate employees with material, financial, or social external rewards, but how to develop intrinsic motivation. For organizations, and particularly for Human Resources, this has required asking themselves how to develop an engaging and motivating dynamic that benefits both employees and the organization, because employees search for companies where they feel good and where they feel they are doing good (Rigby and Ryan, 2018).

In self-determination theory, Deci and Ryan place the different levels of motivation on a continuum, with progressive levels of regulation that we will explore below.

- The lowest level of this continuum is amotivation, which is a state that manifests itself by a complete absence of motivation and intention. We are confronted here with a disinterest of the individual for the activity concerned. The latter does not feel competent to carry it out, has the belief that his action will not produce results (Deci and Ryan, 2008). Moreover, amotivational states are often associated with poor well-being and poor quality performance (Vallerand, 2000).
- We have at the next level, the different degrees of extrinsic motivation which manifest themselves through four stages:
 1. First the so-called external regulation: here the behavior is performed to satisfy an external demand or obtain a reward (Ryan and Deci, 2000).
 2. Then introjected regulation: in this form of regulation, the individual acts by constraint to avoid a form of anxiety or guilt. The individual accepts a requirement or a request but without integrating it personally or identifying it as an action for himself. This form of submission allows individuals to improve their self-esteem and glorify their ego (Ryan and Deci, 2000).
 3. The third level of extrinsic motivation is that of identified regulation; here the individual identifies with the activity and accepts it freely once s/he has grasped the benefits that it could represent for her/him, even if it is carried out to satisfy an external demand (Ryan and Deci, 2000).
 4. Finally, integrated regulation is the most autonomous form of extrinsic motivation, because it is assimilated in certain aspects to intrinsic motivation. In this form, the activity is in harmony with the values and needs of the individual. The more the individual assimilates the meaning of the action, the more the extrinsically motivated actions are self-determined (Ryan and Deci, 2000).

The most powerful level of the continuum is that of intrinsic motivation where the individual engages voluntarily in the activity because of the pleasure s/he finds in carrying it out. This autonomous regulation makes it possible to predict an individual's perseverance and adherence to complex tasks (Deci, Olafsen and Ryan, 2017).

The self-determination theory of Deci and Ryan (1985, 2008; 2000; 2005; 2017) suggests that humans tend to satisfy, in an innate way, 3 fundamental psychological needs which are autonomy, competence and affiliation. Satisfying these needs is essential. Also, these needs are universal, observable and they apply to all organizational cultures, to all workplaces, to all people (Deci, Olafsen and Ryan, 2017). When employees are intrinsically motivated, they progress in meeting these needs and experience psychological well-being.

- Autonomy is the need for an individual to be an actor in her/his life, to have the feeling of being able to choose, to act according to her/his will and to approve the choices which concern her/him. In the company, this is characterized by the control and freedom that the employee exercises over the actions that fall within her/his scope of activity (Deci and Ryan, 1985).
- Affiliation is our fundamental need to feel that we belong to a community, that we are connected to other individuals. In the company, this need is satisfied when the collective is important on a daily basis and has its own identity (Deci and Ryan, 1985).
- Competence is our fundamental need to feel efficient and to succeed. At work, individuals need to know that they have everything they need to succeed in their activities: resources, skills, expertise (Deci and Ryan, 1985; Elliot, McGregor and Thrash, 2002).

1.4 Research Question

Considering that competence is the result of the articulation of internal and external resources to the individual, competence management will require to develop both internal and external resources. Yet, competence management in the professional context tends to be predominantly addressed through management of external resources only: managerial support, investments, design of training programs... Regarding internal resources, beyond knowledge, know how and soft skills, self-determination theory draws our attention on motivational processes likely to foster the satisfaction of the need for competence. Intrinsic motivation is particularly important to stimulate competence development in accordance with individual preferences, attitudes and behaviours. Besides, identified motivation may be driven by the meaning of work and the congruency between individual and organizational values. Figure 2 provides an overview of our conceptual framework for this research.

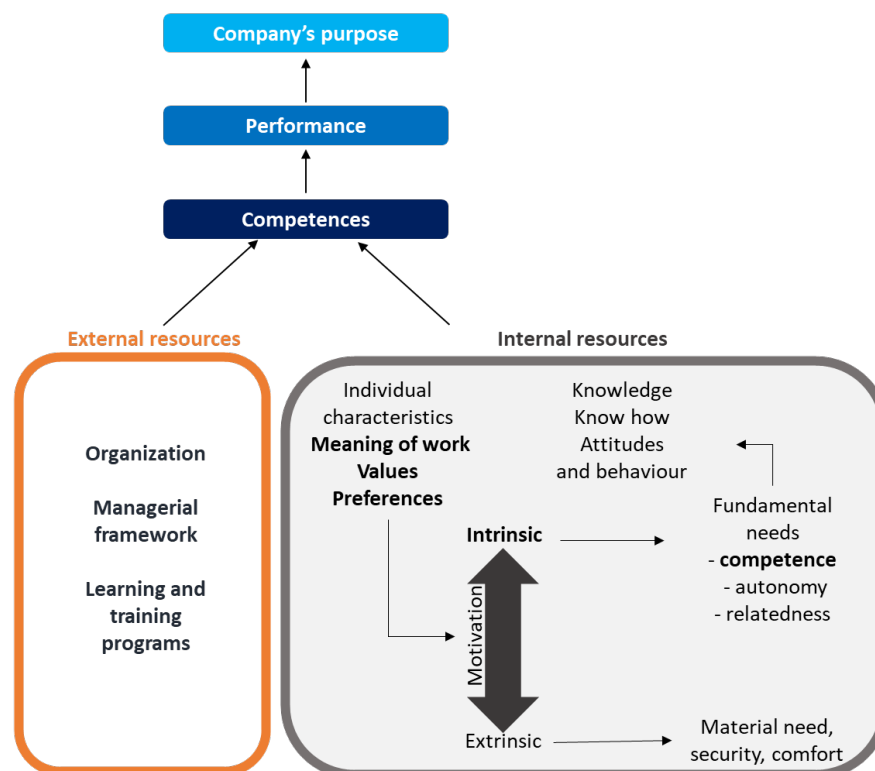


Figure 2: Our conception framework for competence management

More generally, our research question focuses on the identification of the drivers of competence management, including individual drivers (e.g., job satisfaction, professional evolution, intrinsic and extrinsic motivation) as well as organizational ones (e.g., management, culture).

The objective of our study is to find out how to encourage employees to fully develop their competence, relying not only on organizational resources and managerial injunctions, but also on their self-determined power and will. To this end, we ran a field study in a major French company from the energy sector. One of the biggest challenges for this company to achieve its ambition is to improve the performance of its power plants. There are several lines of work to achieve this purpose, our contribution will be limited to the area of competence.

2. Field Study

2.1 Context

Our study takes place in a major French electricity production company which belongs to the French state. It was created in 1946 and its activities are focused on the production of electricity from nuclear, thermal, hydraulic sources and the transportation and distribution of electricity. The company is present in many countries and is divided into several departments with about 165,000 employees.

Every year, the company collects the opinion of employees on their professional situation as well as the perception they have of their company, at local level and also at the Group level. By identifying areas of satisfaction and areas for improvement, this survey helps guide priorities and inform action plans within the teams.

In 2021, the group achieved its best participation rate with 79% of respondents, which represents approximately 115,000 employees. The survey generally takes place over 4 weeks, between the beginning of November and the beginning of December each year. It is conducted by an external survey institute, which guarantees the anonymity and confidentiality of responses. The results are presented to employees from February of the following year.

For the purpose of our study, we got access to the data of the 2020 survey for the nuclear department and re-analyzed them with a special focus on competence management.

2.2 Data Collected

The current study on competence was restricted to a specific production division representing 22,000 employees. Among them, about 11,000 answered the 51 questions. For confidentiality reasons, individual responses were not made available to us; we could only access averaged responses for teams of at least 10 employees. We extracted the results of the survey for the year 2020 from 583 teams spread over 21 units (19 power plants, 1 national operating engineering unit and central services). These teams each bring together 10 to 87 employees, with an average of 17.6 (SD = 8.3). In total, the answers of 10,281 employees are represented through the results.

The 583 teams were categorized according to their executive and non-executive population. We also categorized them according to their profession: 185 Maintenance teams, 94 Operator teams, 23 Project teams, 79 Support teams, 25 Executive teams, 177 undefined teams.

2.3 Results

We analyzed the responses to 43 questions out of 51 and gave a special attention to one of them coming closest to our object of study: this question is Item 27 "My job allows me to fully use my skills".

The first step of our analysis was to examine the factorial structure of the full corpus of 43 questions using Principal Component Analysis. The results show a structure in 5 components:

- The first component includes questions such as "I feel like an actor in the changes that are carried out in my unit", "I adhere to the strategy and orientations of my entity". We decided to name this component "Involvement and Trust in Unity".
- The second component includes questions such as " My manager invests in the development of my skills", "My manager empowers his employees". We decided to name this component "Team Management".

- The third component includes questions such as "I am optimistic about my own future within the company", "I am satisfied with my professional development possibilities". We decided to name this component "Meaning of work".
- The fourth component includes questions such as "I work in good health and safety conditions", "In my unit, we are encouraged to innovate, to seek new ideas to improve efficiency / improve our services". We decided to name this component "Working conditions".
- The fifth component includes questions such as "In my unit, we cooperate easily between departments / teams", "In my unit, we succeed in simplifying processes and organizations to increase efficiency". We decided to name this component "Organization and cooperation".

Each of these 5 components is robust from a statistical point of view (Cronbach's Alphas greater than 0.7). This means that to simplify the data, we could reduce the 43 questions to 5 key indicators. Regarding skills and need for competence, we observe that Item 27 "My job allows me to fully use my skills" correlates strongly to the third component related to meaning of work.

In a second step we focused on the professions most involved in power plant performance: Operators, Maintenance and Projects. We carried out an analysis of variance to find out whether the profession had an effect on certain variables. The results highlighted significantly different scores depending on the profession for 15 questions, showing that Maintenance systematically has lower scores than the two other professions. In particular, Maintenance exhibits a significantly lower score on the following items (Figure 3):

- Item 27 on feeling of competence "My job allows me to fully use my skills" ($F(2/299) = 19.97, p < 0.001$);
- An item related to intrinsic work motivation "I am satisfied with the content of my job" ($F(2/299) = 16.99, p < 0.001$);
- An item related to extrinsic motivation "My overall remuneration correctly rewards my performance and my contribution" ($F(2/299) = 6.61, p = 0.002$);
- An item related to professional development "I am satisfied with my possibilities of professional evolution" ($F(2/299) = 9.78, p < 0.001$).

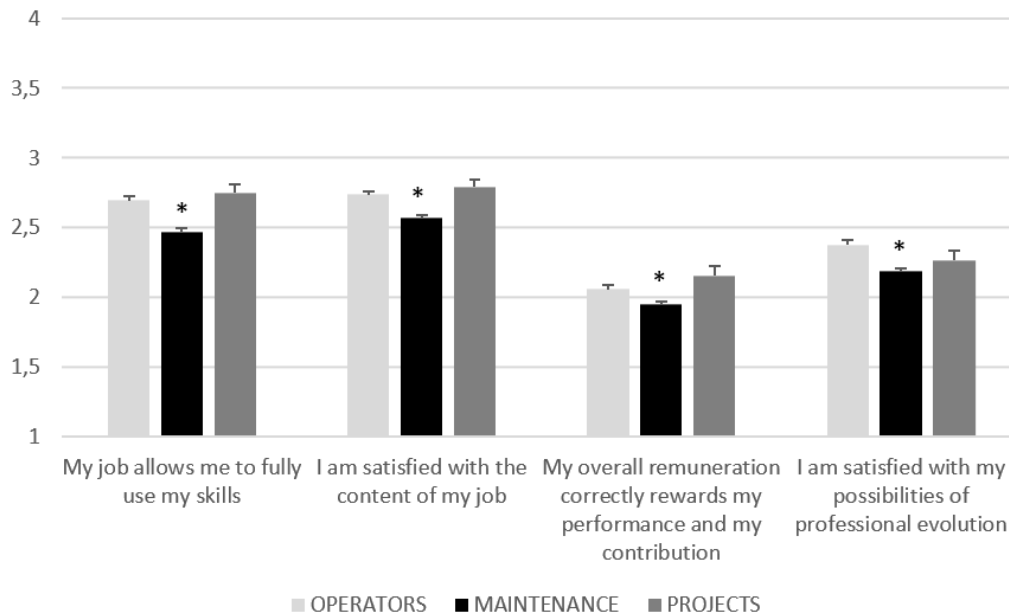


Figure 3: Effects of profession on the scores to four important variables related to competence and motivation

Finally, we searched for predictors of Item 27 "My job allows me to fully use my skills" through multiple regression and ran the analysis separately for Maintenance teams and Operators teams. We could not carry out the analysis for Project teams, as they were not in a sufficient number (N = 23 Project teams). The results (Table 1) highlight different significant predictors for Maintenance and Operator teams.

Table 1: Outline of multiple regression analyses performed on two professions: Operators and Maintenance with feeling of competence (Item 27) as Dependent Variable and all other survey questions as predictors. Significant positive predictors are highlighted in green and significant negative predictors are highlighted in red

	OPERATORS	MAINTENANCE
My manager is involved in the development of my competence	Predictor +	Predictor +
I am satisfied with the content of my job		Predictor +
I am satisfied with my possibilities of professional evolution		Predictor +
I feel involved in the changes that are carried out in my unit		Predictor +
Digital tools have a positive impact on my efficiency		Predictor +
My overall remuneration correctly rewards my performance and my contribution		Predictor +
I am satisfied with my workload		Predictor –
I have the feeling that the general situation of my unit is getting better	Predictor +	
I feel I belong to the company	Predictor +	
In my unit, we have the necessary skills to achieve our goals	Predictor +	
My manager cares about the people s/he works with	Predictor –	
In my unit, reviewing our ways of working and our organization is useless / not essential	Predictor –	
Dependent variable: “My job allows me to fully use my skills”		

The only common predictor between Maintenance and Operators is the involvement of the manager. For operators, the feeling of using one’s skills fully is rather linked to the dynamics of the unit and the feeling of belonging to the company (collective dimension). Conversely, for Maintenance, the individual dynamics is more important to determine the feeling of fully using one’s skills (work content, professional development). In addition, remuneration appears to be a positive predictor as well as the digital tools available.

3. Discussion

The aim of this study was to find a way to perform a first broad diagnosis on the main drivers of competence in a huge corporate division gathering about 22,000 employees. Conducting a proper survey dedicated to such a diagnosis would have taken months, or years, if possible at all. Alternatively, we found a way to get quickly first insights on the situation and make first methodological decisions.

We got access to the data of a yearly internal survey including an interesting question on the feeling of fully using one’s skills and re-analyzed the data for the purpose of our project. The results of the survey are routinely used to monitor employees’ satisfaction on a number of subjects and compare units with one another, based only on descriptive analyses. In contrast, we used the same data to perform inferential analyses and identify new results, point out the differences between several professions and emphasize the links between several variables – links that are implicit, unknown by the respondents themselves, and likely to guide action from an operational viewpoint.

At first sight, competence management can be restricted to designing learning and training programs, and this is the way it is often addressed in companies. However, psychological literature draws our attention of mechanisms that do not fall under the scope of learning or training. In particular, competence is acknowledged as being one of the three fundamental psychological needs, considered as innate and universal, and as such likely to strongly interact with motivational processes. Our aim in this project is to highlight such motivational drivers of competence in order to renew corporate approaches of competence management, by including motivational concerns.

In the field study we conducted, the feeling of competence appeared to correlate strongly with the dimension related to the meaning of work, which is consistent with the abovementioned theoretical framework on

motivation and self-determination, questions deep values of the individual and oversteps what can be addressed through training.

Furthermore, the predictive models computed through multiple regression analyses showed that the drivers and barriers to feeling competent were different according to professions. For Operators, feeling competent appeared to be mainly linked to external resources such as unit performance and social identification, while Maintenance teams seem to be more impacted by individual resources (e.g., work content and career development). This set of results suggests that there is no unique solution for managing competence and that competence building should be thought in accordance with each population's characteristics and needs.

From an operational viewpoint, as our analyses of variance showed that Maintenance teams scored significantly lower on a number of variables, including those referring to competence, motivation, and professional evolution, we decided to give priority to this specific population for our first field interventions. Consistently, the next steps of our research are dedicated to a more detailed diagnosis for competence drivers at the individual and at the team level. On the basis of this specific diagnosis, we are designing custom interventions for each team to foster motivation and competence. Hence we expect to set out a competence development program based primarily on intrinsic motivation (behavioral and attitudinal predominance, self-accomplishment), identified motivation (meaningfulness at work, personal and corporate values, congruency building), and managerial inspiration through the development of transformational leadership. The final aim is to develop jointly individual wellbeing and corporate performance, in order to contribute to the company's missions and purpose in the service of society.

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