

Towards a Competence Management Approach Based on Continuous Improvement

N. Sefiani, C. Fikri Benbrahim, A. Boumane, K. Reklouï

Abstract—Nowadays, the reflection on competence management is the basic for new competitive strategies. It is considered as the core of the problems of the global supply chain. It interact a variety of actors: information, physical and activities flows, etc. Even though competence management is seen as the key factor for any business success, the existing approaches demonstrate the deficiencies and limitations of the competence concept. This research has two objectives: The first is to make a contribution by focusing on the development of a competence approach, based on continuous improvement. It allows the enterprise to spot key competencies, mobilize them in order to serve its strategic objectives and to develop future competencies. The second is to propose a method to evaluate the Level of Collective Competence. The approach was confirmed through an application carried out at an automotive company.

Keywords—Competencies, approach, continuous improvement, collective competence level, performance indicator.

I. INTRODUCTION

IN a highly competitive environment, the enterprise must show more flexibility, responsiveness and innovation. Being aware of these requirements, the enterprise pays particular attention to the involvement of human resources as distinctive feature of its performance. Indeed, the ability to identify key competencies, to mobilize and recognize them and encourage their development is the primary concern of the enterprise. For this reason, it is essential to develop methods and tools that allow effective competence management.

In this research, we attempt to develop an approach to competence management which enables managers to identify, deploy, and develop individual and collective competencies of the organization. It is structured as follows: First, we introduce a review of related works concerning: The process approach; the competence management which includes the management concept and competence management in industrial engineering. Second, we present our new method regarding competence management approach, and which is based on the principle of continuous improvement and the determination of the collective competence level based in the performance indicator. Finally, we provide an experimental result realized at an automotive company and then present the synthesis of the prospects of our research. Our goal is to provide decision

C. FikriBenbrahim is with the Faculty of Sciences and Techniques of Tangier, Abdelmalek Essaadi University, Morocco (corresponding author to provide phone: (+212) 651-612-213; e-mail: chahinaze.fikri@gmail.com).

A. Boumane is with ENSA-Tangier, Abdelmalek Essaadi University, Morocco, (e-mail: abd_boumane@yahoo.fr).

K. Reklouï and N. Sefiani are with the Faculty of Sciences and Techniques of Tangier, Abdelmalek Essaadi University, Morocco (e-mail: kamal.reklouï@gmail.com, tsefiani@gmail.com).

makers with a methodological framework, facilitating competence management and leading to the improvement of business performance.

II. REVIEW OF RELATED WORKS

A. The Process Approach

The process approach has attracted much interest and attention, particularly when it was referred to by [1]. It is a method of analyzing or modeling the enterprise, which is based on business processes identification. Its description, measurement and improvement are for the purpose of achieving the desired performance.

The concept of "process", which is the core of the approach, is considered as "a set of activities connected together, using information flows or significant material, and combined to provide an important and well-defined material or immaterial product"[2].

In quality management standard [3] that any activity or set of activities using resources to transform inputs to outputs can be formalized as a process.

As we refer to the process model proposed by [1], we find three types of processes; they are as follows:

- Management processes (policy, strategy, technology and innovation, plan, budget, decision, measurement),
- Support processes (resources, training, IT, accounting, and maintenance),
- Implementation processes (product, design, manufacturing, sales, and service).
- Managing the enterprise using a process approach, allows to get, approximately, to the notion of value [4], and every management process needs some control steps [5]. This approach facilitates:
 - The diagnosis and analysis of the origin of the performance from the conditions of carrying out business activities,
 - Control by directing activities according to the overall objectives set by the business strategy,
 - Management of competencies and the know-how of employees [6].

The development of the process approach has led to the emergence of several models and modeling methods. Process modeling focuses on developing methods and tools to represent the structure of organizations, their processes, entities and flows that connect them. It allows the formalization of business operation by using a standard and easily understood language. The semantic richness, provided by the methods and modeling tools, leads actors to a clear and shared vision of the key processes of the organization. From

the considered point of view and the objective of modeling, there are several models and modeling methods namely: IDEFx, SADT, EPRE, ARIS, SCOR EVALOG, GERAM, PERA, GIM... etc.

The process concept is central to the Supply Chain Management "SCM". It is seen as a way to an ideal management of actions, physical flows, and exchange of information between entities in the supply chain [7]. There are several reference model used in SCM among which is the SCOR (Supply Chain Operation Reference) model that defines the best practices that ensure a more efficient supply chain is based on five processes: Plan, Source, Make, Deliver and Return [8]. The SCOR Model is an operations framework that provides a common process-oriented language for communication between supply chain partners [9]. Finally we can say that the relevance of the process approach resides in its ability to understand business operation through the notion of purpose to ensure continuous performance improvement. Thus, it provides a rich framework to develop a pertinent competence management, in which we situate this research. We consider the enterprise not only as a network of processes, but also as a network of competencies that is necessary to identify, develop, maintain, and encourage to emerge through appropriate management.

B. Competence Management

1. The Management Concept

The Management Concept is rooted in areas such as cybernetics, automatic control and management. According to literature review, the authors and scientific fields, the notion of management has a number of definitions one of them is: is variously defined in the literature. Generally, to manage is the determination of the best trajectory to achieve a given goal. Thus, one must act continuously to correct deviations from this trajectory. In the same vein, [10] defines management according to two levels:

- Regulation which consists of reducing the differences between expected and achieved values of key variables by acting on the action variables.
- The control which consists of setting the expected value of each key variable and the corresponding values of action variables simultaneously.

According to [11], "To manage is to define and implement methods allowing the learning of how to act effectively and more efficiently." In order to achieve the required performance, the management necessitate, among others, indicators (or dials) and decision variables (or levers) [12].

Inspired by the Deming Wheel, [13] considers management as follows:

- Generate an action plan in a given environment (Plan).
- Implement this action plan (Do).
- Control the management system during implementation and at the end of the action plan (Check).
- Act based on this control (Act).

We rely on this management vision as well as the Deming Wheel to propose a competence management approach.

2. The Competence Management in Industrial Engineering

The Competence Management in Industrial Engineering aims to improve business performance by efficiently allocating and deploying mobilized competencies in its processes. The general process of competence management can be divided into five stages: Acquisition, allocation, development, maintenance, and use [14].

The management of an enterprise competence system is a five-level structure that has been introduced by [15] they are as follows: HR management; operational management; competency and competency characterization; policy of competency characterization and firm strategy.

Each level meets different management goals and horizons. This structure introduces the process of "competency characterization": the construction, acquisition, consolidation, preservation, expansion, implementation and transfer of competencies.

In Industrial Engineering, [16] proposed a classification of the different competence management (see Table I). This classification has been structured in a systemic vision with three views: structural, functional, and evolution, which can be managed at three hierarchical levels of decision: *strategic, tactical and operational*.

The *strategic* level deals with decisions on strategic management which are strategy formulation, identification of strategic competencies, etc... . The purpose of strategic management is to ensure sustainable business competitiveness.

- The structural view focuses on the identification of core competencies and the definition of strategic objectives.
- The functional view deals with the mobilization of the mechanisms of competencies.
- The evolution view concerns the evolution competencies' processes (notion of competence trajectories and dynamic models).

The *tactical* level includes decisions on the design of the organization (job roles, team projects, ...).

- The structural view focuses on the identification of available competencies, their evaluation and their integration into performance measurement.
- The functional view concerns the problem of team building, tasks assignment or partners' selection in distributed organizations.
- The evolution view focuses on the anticipation of new roles or tasks and the implementation of action plans to develop competencies.

The *operational* level focuses on the management actions in connection with the activities implementation.

- The structural and functional views focus on the implementation of managerial mechanisms that facilitate, assist, or direct the activity of actors and transmit information at the tactical level.
- The evolution view concerns the follow-up of implemented action plans and the identification of training and career requirements of employees.

A review of some research related to the key aspects of competencies management was presented in [18]. This review has been arranged according to the following themes:

- Appraisal and identification of key competencies.
- Integration of competencies in performance evaluation.
- Allocation of competencies and team building.
- Development of IT support.
- Characterization of competencies and standards.

TABLE I
 TYPOLOGY OF COMPETENCE MANAGEMENT' AXES [17]

	Structural view	Functional view	Evolution view
<i>Strategic</i>	-Identification of core competencies at the enterprise level - Objective definition (definition of strategy)	-Deployment of strategy through collective competencies. - Inter-firms relationship management	-Competencies trajectory, adapted to new technological orientations (technology, tools, methods, etc.) -(Networked) firms' life cycle management
<i>Tactical</i>	- Identification of available competencies -Competence evaluation - Analysis "strengths and weaknesses" on processes	-Team building -Competence allocation (task assignment) - Competency-based process simulation -Partners selection in distributed organizations. - Competence-oriented risks management	-Anticipation of competence evolutions (new roles, new requirements, etc.) - Formal models of competence dynamics - Action plans to develop competence
<i>Operational</i>	-Local vision on operational performances - Psychological and social mechanisms, mutual adjustments, etc.	mobilization mechanisms, autonomy, reactivity,	- Learning by doing, knowledge explication or acquisition, new management practices - Education, training

To summarize, competence management is integrated as a fundamental concept to master and improve business performance. However, there is a short of researches dealing with the methodological framework for competence management. Hence, this study provides a contribution to the field by proposing a competence management approach.

III. PROPOSED METHOD

The proposed competence management approach seeks to answers mainly the following question: How can a company manage its competencies in order to achieve the required performance? The proposed method is based on the principle of continuous improvement, illustrated by the Deming Wheel.

A. The Deming Wheel

In 1950 the Deming Wheel appeared as the basis of the Shewhartcycle as referred to in [19]. Thereafter, the Deming wheel was translated into PDCA (Plan-Do-Check-Act)[20] by the Japanese (Fig. 1). It consists of a logical sequence of four repetitive phases for continuous improvement. The idea is to use the four phases until the expected level is reached.

Reference [21] modified the Shewhart cycle in 1993 and called it the Shewhart cycle for learning and improvement, PDSA (Plan-Do-Study-Act) cycle. He described it as a flowchart for learning and improving a product or process. This modification was consolidated by researchers [22] to form the basis of the improvement model.

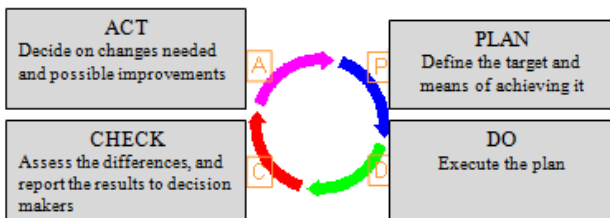


Fig. 1 Principle of the Deming Wheel

B. Wheel of Competence Management

In this research, we make the structured approach available for the enterprise, the fact that will serve as a reference model

for efficient competencies management. Moreover, the enterprise can rely on this approach to cope with the changing environment and deal with the constant internal and external challenges.

In addition, this structured approach is scalable and flexible; it is based on the philosophy of the Deming Wheel [21]. The Involvement of the movement of the Deming wheel needs to find an engine capable of overcoming the challenges as well as achieving strategic objectives, which are broken down in terms of individual and collective competencies. For this reason, it is necessary to focus on the business action systems (processes and activities).

Yet, the approach focuses on the competency logic as a management device initiated by higher management, aiming towards the adaptation of the enterprise strategies by its environment.

The process is divided into five phases (Fig. 2):

1. Initialization phase,
2. Planning phase,
3. Integration and deployment phase,
4. Evaluation phase,
5. Development phase.

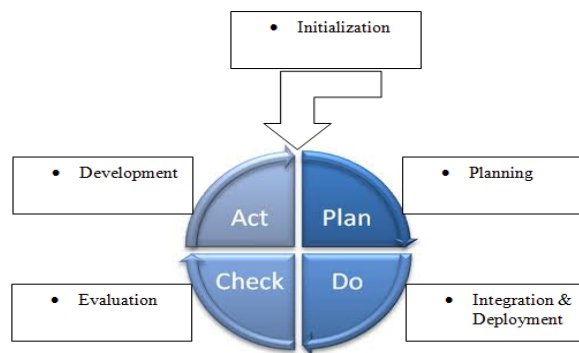


Fig. 2 The competence management wheel

1. Initialization Phase

The initialization phase is a strategic and decisive phase that will ensure the success or failure of the management system. It

leads the enterprise to conduct a thorough review of the current management system in order to evolve and improve in line with the business strategic objectives (technology selection, product development, financial investments, etc...). In fact, the initialization phase conducts competencies diagnostic to identify gaps and deficiencies at a qualitative and quantitative level such as the number of employees. It is a good step to gain a better understanding of the enterprise, its strengths and weaknesses. In this sense, we can also use a benchmarking study that will guide us to the identification, analysis and adaptation of best [23]. This analysis should result in competence management actions to ensure the success of the business strategic plan. This phase includes the following steps:

1.1 Identification of Different Strategic Issues and Objectives

This step aims to clarify the strategic issues facing the enterprise, which must be overcome by the competence management system, and translate them into strategic objectives. It also aims to address the following questions:

- What are the levels of performance and results to be achieved?
- What are the main strengths and difficulties to be overcome?
- What are the major projects to implement?
- Does the enterprise have the necessary resources?

For each identified strategic objective, we present the key success factors that highlight their added value.

1.2 Formalization of the Competency Concept

In this step it is important to formalize the competency concept specified by the enterprise and its business environment. Reference [24] argues that most of the projects of competencies management fail or being phased out because they do not have a relevant concept of competency. Indeed, the key question is to know "what concept of competency" organizations have to cope with to face the challenges. A literature review on the competency concept is explained in details by [25]. Based on the selected concept, the enterprise is allowed to develop or adopt a competency model that will provide a formal support for effective competence management.

1.3 Identification of Required Competencies (Competency Framework)

This step has for objective to identify the required competencies for the tasks and activities, in a way that matches the expected performance. It is an important and crucial step for management decisions at all horizons. It represents the target the process of competencies development should be oriented to competency framework. It is related to the professional situation and described in terms of activities to be performed.

In this sense, the approach of competencies identification that the enterprise can adopt to build its competency framework has been proposed by [25].

1.4 Identification of Available Competencies

Again, in this step, the identification of the pool of competencies available within the enterprise is essential. The implementation of the evaluation system will allow employees to confront their acquired competencies and those to be developed in the future. It is concerned with the assessment of competencies. As described by [26] "The assessment is a process of judgment of staff in a systematic procedure which sets the rules and conditions".

It is necessary to identify the gaps between the required competencies and those acquired, and trigger the necessary action plans. Competencies assessment must be performed by striking a balance between the needs of the business, the potential capabilities, and career aspirations of employees. Therefore, it addresses:

- Better knowledge of human capabilities and available potentials;
- Optimization of competence management and their effective mobilization;
- Identification of problems and failures encountered in the workplace.

1.5 Competencies Assessment Includes

- The assessment of available competencies, held by the actors, can be achieved through two approaches: the study of the performance achieved in situations of work and the study of adopted professional conduct.
- The assessment of potential competencies makes the enterprise achieve the balance between an employee and a job as it exists and as it may evolve. Furthermore, for the individual, to mobilize his best competencies in line with professional aspirations. A summary of the methods and tools used for the assessment of competencies was developed by [27] as part of his thesis.

After the initialization phase, we set the priority areas for improvement.

2. Planning Phase

This phase is to plan the actions to be implemented, based on the results of the initialization step. It is to define what policy of competence management is needed to be implemented at the different levels of acquisition, allocation, and competencies deployment. In this phase, different methods of project management can be used, for example, Gantt, Pert, and MPM (Metra Potential Method) methods. From a management perspective, it is necessary to set up a system of indicators to support and measure the effectiveness of planned actions. The development of this phase is achieved through a constructive dialogue between the various business stakeholders.

3. Integration and Deployment Phase

This phase involves the acquisition, allocation, and deployment of competencies. It concerns the achievement of assigned objectives in organizational situations within their pre-set deadlines. It stresses the facts of competency themselves and their conditions of emergence. It is concerned about people and their behaviors determinants, their

relationships with their work and the community to which they belong. It consists of three steps:

3.1 Acquisition of Competencies

This step defines the recruitment policy and interview. Recruitment is a strategic component; it depends directly on the ability of the company to integrate the right competencies at the right time. The success of recruitment depends on all stages of the process. The choice of appropriate tools is essential and valid throughout the recruitment process. Given the importance of this step, the recruitment should be both effective and efficient, because it involves important direct and indirect costs of recruitment that can influence the progress of the company such as: cost of offices, vacancy, loss of customer, etc. The recruitment process should be based on:

- The formulation of the candidate profile derived from the competency framework.
- The pool of available competencies.

Successful integration reflects the success of the recruitment policy. The integration period is difficult for both the employee and the enterprise. Without a well thought out integration policy, allowing the employee to be integrated into the business and incorporated in his team, the risks of failure are highly probable.

3.2 Allocation of Competencies

It consists of allocating human resources and follows up their competencies. It also includes the establishment of effective teams work. The allocation of human resources is available through all decision-making levels of the enterprise (strategic, tactical, and operational) corresponding to time horizons (long term, medium term, and short term).

The allocation of human resources in the long term is the provisional planning of competencies. This strategic level must highlight the future required competencies based on the economic environment changes, organizational and socio-technical changes of the enterprise. The enterprise is allowed to set the allocation policy expertise based on the changes mentioned above. The gap's analysis of the future needs competencies; the available ones can identify failures that disrupt the development of the organization [28].

Competence management in the medium term is to plan the deployment of staff. In this perspective, the challenge is to determine the configurations of actors' assignment to activities based on their skills. The objective is to adjust production capacity in relation to the projected load without a nominative assignment of employees [29].

The short-term allocation allows scheduling and allocating human resources taking into account the operational constraints such as: their availability, their breaks, leave, and their competencies. In this regard, the objective of human resources' scheduling is to improve the performance of production processes by ensuring greater flexibility of resources allocation. In fact, the main constraints to be considered in the allocation of human resources relate to the availability of employees, the match between the acquired and required competencies, the number of employees and the

generated performance within the activities and processes. We should note here that some research take into account the aspect of competency as a key factor in the allocation of human resources [30].

Finally, regardless of the time horizon, allocation of competencies is essential in the process of competence management. Thus, it is necessary to pay special attention to this step because of its influence on the performance of the business operational processes.

3.3 Competencies Appraisal

Once recruited, hosted, and integrated, the career of the new employees must be followed up carefully to reconcile their expectations with those of the enterprise, and to increase their ability to adapt and develop their skills.

In this sense, the development of competencies has to:

- Encourage teamwork.
- Support internal and external mobility.
- Promote tasks' enrichment rather than Taylorism.
- Involve human resources by assigning responsibilities.
- Motivate, recognize, and retain human resources.

4. Evaluation Phase

This phase includes the assessment of competencies and the audit of the management system. First, it consists of measuring the gap between the available competencies and the requirement of the business processes, and then identify the necessary improvements actions (subject of the competencies development's phase).

In this context, we explore methods and tools for assessing the competencies mentioned above in section *Initialization phase* and the sections: *Collective Competence Level Method* and *Performance indicators: The Workload*, which are mentioned below. Second, we will perform an audit the management system. The objective is to identify strengths that will be built good practices and improves weaknesses. In this sense, the auditor must ensure that the management system put in place as a whole is consistent with the business strategy. For this reason, it must analyze all processes of the strategy's implementation (recruitment and integration, allocation, and deployment). This analysis should be based on performance indicators defined for each process.

Having completed the evaluation phase, the auditor is required to define the appropriate action plans which will constitute be the final phase. This has to be done in consultation with the business stakeholders.

4.1 Collective Competence Level Method

We propose to determine the Collective Competence Level of the team 'k', (1) is used. This method is based on the calculation of the Individual Competence Level method which has been presented by [31]:

$$CC_{K,indicator} = \left(\sum_{i=1}^n indicator_{ik} \times W_i \right) / \left(\sum_{i=1}^n W_i \right) \quad (1)$$

with $\forall k \in \{1...h\}$ and W_i : Weight of activity i $\sum_{i=1}^n W_i$. The indicator used is shown below.

4.2 Performance Indicators: The Workload

In order to specify the effectiveness of work we use the workload indicator. It considers the Number of good parts and Cycle time. The formula is:

$$\text{Workload} = \text{Number of good parts} \times \text{Cycle time} \quad (2)$$

5. Development Phase

This phase implement necessary action plans to address the identified gaps between the competencies needed and those available and also to improve the weaknesses of the competence management system. The actions plan is expected to include the following information: tasks with their sequence, resources' allocation, schedule of implementation, expected results and the means of control. With regard to the relationship between "axis of progress / actions plan," according to relevance, two scenarios are possible: either we associate an actions plan to each subject area for improvement, or actions plan are defined for a group of axes. Several actions can be taken as follows:

- Recruitment of new competencies,
- Use of external expertise (consulting, outsourcing, temporary, etc...),
- Development of poly-competency,
- Training plans,
- Mobility and career management,
- External coaching (mentoring) and internal coaching (tutoring),
- Reorganization and restructuring,
- Review of the control system,
- Performance review.

To support actions' implementation, an adjustment and monitoring process is needed. It is, on the one hand, to follow up the performed actions and adjust them if they deviate from the goals set initially. Monitoring is done on the basis of performance indicators, revealing the status of actions taken on the ground. These can lead each action with the visibility and vigilance required to achieve the objectives. In case of failure or drift, corrective actions will be triggered. The adjustment of actions will bring us back to previous steps to adjust the actions plan based on new requirements and constraints encountered in the field. However, any adjustment must be justified to keep the challenging and ambitious nature of initial goals.

IV. EXPERIMENTAL RESULTS

The work was experimented at an automotive wiring harness manufacturer located in the Tangier Free Zone. The process of manufacturing a wire harnesses consists of four steps:

- CC: Cutting and Crimping,
- P-A: Pre-Assembly,
- A: Assembly,
- QCP: Quality Control and Packaging.

The company has a real problem in the competence management that disrupts its performance and continuity. In order to overcome this problem the company followed these

steps:

A. Initialization Phase

1. Identification of Different Strategic Issues and Objectives

For the purpose to solve the problem of competence management the staff decided to establish a Competence framework and improve the Level of Collective Competence based on the performance indicators with incorporation of all resources (planning methods, actors and tools).

In order to help the evaluator during the recruitment the company listed the candidate's profiles' (competence concept formalized (see details in [25])). After the selection of the candidate the staff dresses a list of required competencies (required competencies (Competence framework) identified (see details in [25] and see Tables II and III). And then, they determined the available competencies and measured the gap between the required competencies and available competencies (See Table IV). Finally, they fixed a deadline in order to correct the gap and make action plan (See Table IV).

TABLE II
REQUIRE COMPETENCE OF CUTTING AND CRIMPING, PRE-ASSEMBLY AND ASSEMBLY

Type	Require competence
Education	-Technique or scientific baccalaureate -5thyear secondary level -1st year baccalaureate -Baccalaureate level -Professional certificate of specialization
Languages	-Arabic: Good -French: Good
General Knowledge	-Able to read, write and count. -Knowing the general rules of hygiene and security. -Communicate clearly and precisely by adopting the appropriate professional language.
Relational knowledge	-Collaborate with stakeholders by effectively managing conflicts encountered to achieve the common targets

TABLE III
REQUIRE COMPETENCE OF QUALITY CONTROL AND PACKAGING

Type	Require competence
Education	-Professional Baccalaureate /scientific / Technique Baccalaureate -BTS Industrial Control -Arabic: Medium
Languages	-French: Recommended -Spanish: Medium
General Knowledge	-Able to read, write and count. -Knowing the general rules of hygiene and security. -Communicate clearly and precisely by adopting the appropriate professional language.
Relational knowledge	-Collaborate with stakeholders by effectively managing conflicts encountered to achieve the common targets -Knowledge of materials and techniques (fabrication, assembly, etc..) -Knowledge of manufacturing processes and control points -Knowledge of standards and quality control techniques, metrology, testing
Profession Knowledge	-Applying strict processes -Knowing the methods of quality control, and level of quality assessment criteria.(quality grades repository, control measurements, assessment of tolerances). -Knowing the process of industrialization and manufacturing of cable.

B. Planning Phase

In order to work in a structural condition the company made a plan:

- To select an adequate staff to correct the gap between the Require and Available competence,
- To select an adequate staff in order to evaluate and identify the competent team,
- To collect the information,
- To analyze and identify areas for improvement,
- To improve the construction of competency framework based not on subjective estimates of a human actor(often the manager)but on a deeper assessment and analysis by involving the concerning actors.

TABLE IV

EXAMPLE OF GAP BETWEEN THE REQUIRE AND AVAILABLE COMPETENCE OF AN EMPLOYEE IN THE SECTION OF CUTTING AND CRIMPING, PRE-ASSEMBLY AND ASSEMBLY

Require competence	Available competence
-Technique or scientific baccalaureate	-
-5thyear secondary level	-
-1st year baccalaureate	-
-Baccalaureate level	-Baccalaureate level
-Professional certificate of specialization	-
-Arabic: Good	-Arabic: Good
-French: Good	-French: Medium
-Able to read, write and count	-Able to read, write and count
-Knowing the general rules of hygiene and security.	- Not a lot
-Communicate clearly and precisely by adopting the appropriate professional language.	-Communicate clearly and precisely by adopting the appropriate professional language.
-Collaborate with stakeholders by effectively managing conflicts encountered to achieve the common targets	-Collaborate with stakeholders by effectively managing conflicts encountered to achieve the common targets

C. Integration and Deployment Phase

1. Acquisition of Competencies

To predict the needs of manpower, the company identified the type of competencies, resources needed as well as the most appropriate time for recruitment in order to implement the actions that will achieve the ideal thinks to schedule. The company has set a recruitment strategy and has asked responded on issues that facilitate the identification of manpower needs:

- What function do we have to fill?
- How will evolve the current functions?
- What competencies does it take?
- How many people do we need to do the work?
- When and for how long?
- Within the current manpower, there he has employees who can do the job?
- With the development, there he has employees that could do the job?

Before recruiting new resources, the company analyzed the availability of the current manpower. By assessing the available competencies and mobility of employees, it identified the employees who are able to meet new needs or

who, after appropriate training, would be able to work perfectly.

To do this, the company has traced the competencies and abilities of all current employees:

- professional experience,
- performance,
- training and qualifications,
- its fields of expertise,
- interests and career plans,
- its successful learning activities.

2. Allocation of Competencies

The company has determined the number of employees for each post and formed working groups that are working according to the competence, allocated shift, workload, etc...

3. Competencies Appraisal

The working groups have experienced an integration period in which they were well attended and trained by the experts. Also, they were motivated and encouraged by the company that is either material or immaterial level.

To follow up the new employees, the company makes a strategy to evaluate.

D. Evaluation Phase (Calculation of Collective Competence Level)

The company chooses three experts to carry on the study, and there are four teams, each one is formed of four employees according to the appropriate profile. The company aims at improving the Level of Collective Competence which is based on Workload. The results shown in Table V are calculated by (1) and (2).

TABLE V
CALCULATION OF COLLECTIVE COMPETENCE LEVEL

Team	Activity	Workload	Wi	CCK, Workload
T1	CC	3900	0.25	3357
	P-A	3000	0.3	
	A	3328	0.3	
	QCP	3224	0.15	
T2	CC	3300	0.25	3204
	P-A	3900	0.3	
	A	2600	0.3	
	QCP	2860	0.15	
T3	CC	5000	0.25	3898
	P-A	4200	0.3	
	A	3120	0.3	
	QCP	3016	0.15	
T4	CC	2400	0.25	2697
	P-A	4000	0.3	
	A	2080	0.3	
	QCP	1820	0.15	

Table V shows that team T3 represents a higher level of competence (CCK,workload=3898), however, The team T1is an acceptable solution (CCK,workload=3357) and The team T2representsa low level (CCK,workload=3204). But The team T4 represent the worst worker profile (CCK,workload=2697).

E. Development Phase

After specification of the type of strategy to put in place, the company decided to develop an action plan to achieve the

goals and objectives. This plan includes the objectives, those responsible and the deadlines for each of the human resource planning actions and the following actions:

- Review the allocation and the competence of the members of teamwork (T2 and T4),
- Reallocation of resources,
- Learning, Training and Development of competencies.

To ensure the implementation of the actions, the company has set up a staff that monitors the progress of Plan actions. Monitoring is done on the basis of performance indicators.

V.CONCLUSION

Currently, the competence takes a particular dimension and the focus on human capital becomes an absolute necessity. Thus, the interest of the organization shifts from the job to the individual. Also, the concept of competence management is introduced as an alternative to the management of jobs and qualifications. In this paper, an approach to competence management based on the principle of continuous improvement is proposed.

First, we have introduced the process approach that focuses on the concept of processes that guarantee an efficient organizational structure. The framework offered by this approach, based on the objectives and performance indicators, has allowed us to position the management's concept.

Second, we have achieved a state of the art in relation to the competence management, primarily in industrial engineering. At the beginning we introduced the management concept, then, we highlighted the process of competencies management. In this regard, a summary was presented. It highlights the areas of competence management in different views (structural, functional, and evolution) and levels of decision (strategic, tactical, and operational).

Finally, we proposed an approach to competence management structured into five phases: initialization, planning, integration and deployment, evaluation and development. At the level of evaluation we developed a method to evaluate Collective Competence Level based on performance indicator. Our ambition is to develop a reference model for the enterprise, to manage its human capital in line with its strategic objectives, on the one hand and to meet the expectations of its human resources on the other hand.

Potentially, we plan the improvement and enrichment of these contributions. In this context, we want to validate our proposal in an industrial or service setting. In particular, we focus on improving the performance of the overall supply chain by integrating the control SCOR model and our model of competencies management. An early validation of our approach is underway in partnership with a world-class automotive supplier based in the free zone of Tangier. In the end we will develop the calculation of Collective Competence Level based on performance indicator to perform the assessment of competence.

REFERENCE

[1] ISO 9000:2000 Système de management de la qualité, Exigences.

- [2] P. Lorino, "Méthodes et pratiques de la performance", le guide du Pilotage, édition d'organisation, 1997.
- [3] ISO/TC 176, 2009. Quality Management and Quality Assurance. ISO 9000 Family Standards and Norms. ISO Technical Committee TC 176.
- [4] P. Zarifian, "Le modèle de la compétence-Trajectoire historique, enjeux actuels et propositions", Paris: Editions Liaisons, 2001.
- [5] T. Meyer, "How about safety and risk management in research and education?" *Procedia Engineering*, vol. 42, pp. 854-864, 2012.
- [6] P. Lorino, "Le contrôle de gestion stratégique, la gestion par les activités", Paris, Dunod, 1991.
- [7] J.T. Mentzer, W. Dewitt, J.S. Keeber, S. Min, N.W. Nix, C.D. Smith and Z.G. Zacharia, "Defining the supply chain management", *Journal of Business Logistics*, vol. 22, 2001.
- [8] N. J. M. Azmi, R. Z. Rasi, Md F. Ahmad, "Review of Enviropreneurial Value Chain (EVC) based on SCOR Model and NRBV Theory". 2015, *Procedia - Social and Behavioral Sciences*, vol. 172, pp.411-418, 2015.
- [9] M. Seifbarghy, M.R. Akbari, and M.S. Sajadieh, "Analyzing the Supply Chain Using SCOR Model in a Steel Producing Company". Paper presented at the Computers and Industrial Engineering (CIE), 40th International Conference, 2010.
- [10] J. Mélése, "L'analyse modulaire des systèmes AMS", éditions d'Organisation, 1991.
- [11] P. Lorino, "Les indicateurs de performance dans le pilotage de l'entreprise". l'ouvrage Indicateurs de performance, chapitre 3, pp 49-64, 2001.
- [12] AFGI, Association Française de Gestion Industrielle, "Evaluer pour évoluer, les indicateurs de performance au service du pilotage", ouvrage collectif AFGI, 1992.
- [13] V. Clivillé, "Approche systémique et méthode multicritère pour la définition d'un système d'indicateurs de performance", Thesis, Savoie university, 2004.
- [14] K.L. Stenlund and S.A Hörte, "Competence Accounting: Methods for Measuring and Valuing Key Competencies", in: European Operations Management Association VI International Annual Conference. Managing Operations Networks: Venice, Italy, 7-8 June, 1999.
- [15] M. Dulmet and E. Bonjour, "Vers un méta-modèle de pilotage du système de compétences de l'entreprise". 5ème Congrès international conference of industrialEngineering, Québec, 26-29 octobre, 2003.
- [16] X. Boucher, E. Bonjour and B. Grabot, "Formalisation and use of competencies for industrial performance optimisation: a survey" *Computers in industry*, special issue: Competence management in industrial process, 2006.
- [17] X. Boucher, E. Bonjour and B. Grabot, "Formalisation and use of competencies for industrial performance optimisation: a survey" *Computers in industry*, vol.58, pp 98-117, 2007.
- [18] F. Belkadi F., "Contribution au pilotage des compétences dans les activités de conception: De la modélisation des situations à la caractérisation des compétences", Thesis, franche comte university, 2006.
- [19] M. Ronald and N. Clifford, "Évolution du Cycle PDCA", 2012.
- [20] H. Emir, P. Jeimy and J. Cano, "A Systemic Maturity Model World Academy of Science", *Engineering and Technology International Journal of Social, Education, Economics and Management Engineering* Vol.8, 2014.
- [21] W.E. Deming, "Elementary Principles of the Statistical Control of Quality", JUSE, 1950.
- [22] G. Langley, K. Nolan, T. Nolan, C. Norman, and L. Provost, "The Improvement Guide". Jossey-Bass, San Francisco, pp.10, 1996.
- [23] A. Boumane, A. Talbi, A. Hammouche and C. Tahon, "Proposition d'une méthodologie de conduite d'une analyse de l'existant", Colloque international de Conception et Production Intégrées: CPI'2001, Fès, Morocco, 2001.
- [24] G. Boterf, "Construire les compétences individuelles et collectives: les réponses à 90 questions", 3ème édition, Editions d'Organisation, 2004.
- [25] N. Sefiani, A. Boumane, J.P. Campagne and D. Bouami, "Démarche d'identification des compétences requises basée sur une approche fonctionnelle", 9th international conference of industrial engineering CIGI, Saint saveur, Canada, 2011.
- [26] M. Thévenet, "L'appréciation du personnel", Encyclopédie du management, paris, Vuibert, 1992.
- [27] A. Boumane, "Développement d'une méthodologie de gestion des compétences", Thesis, Faculty of Sciences and Technical Fes, 2007.
- [28] N. Guerin, C. Drapeau and S. Melançon, "Planification stratégique des ressources humaines. Guide d'accompagnement", Québec (Canada), May 1992.

- [29] G.L.Vairaltarakis, X. Cai and C.Y. Lee, "Workforce Planning in Synchronous production Systems", *European Journal of Operational Research*, vol. 136, pp. 551-572, 2002.
- [30] L.Franchini, "Aide à la décision pour la gestion des opérateurs de production", Thesis, National Polytechnic Institute of Toulouse, 2000.
- [31] A. Zaki, and al "An evaluation method of human resources in production management" 6th LOGISTIQUA International colloquy. 30-31 May, ENSAT, Morocco, 2013.