

Female Work Productivity Modeling in the Telecoms Sector in Algeria: Case of a Public Company

^[1] Lamia NEDIL, ^[2] Dr Messaoud ZEROUTI

^[1] PhD-Researcher Student in Economic Science, Management and Commercial Sciences. Option: Quality Management, Affiliated University: High National School of Management (ENSM), University Pole of KOLEA, TIPAZA, Algeria, Affiliate Laboratory: Research Laboratory in Quantitative Economics Applied to Development (LEQAD) of the High National School of Statistics and in Applied Economics (ENSSEA)

^[2] Assistant professor "A" and HDR, Affiliated University: High National School of Management (ENSM), University Pole of KOLEA, TIPAZA, Algeria, Affiliate laboratory: Laboratory of Managerial Innovation, Governance and Entrepreneurship (LIMGE) of the High National School of Management (ENSM)

Abstract: - Achieving corporate objectives depends in part on human resource management. Indeed, with the opening of economies to direct investment abroad and the implementation of multinationals, especially in the telecommunications sector, companies (public or private) are increasingly encouraging innovation to face the concurrence.

The objective of this paper is proposing to the public enterprise of the telecoms sector in Algeria a model for calculating the female work productivity, based on a set of econometric and latent generating factors.

To do this, various surveys using a questionnaire were carried out with a random sample of married female employees with at least one child and working in commercial agencies at the front office of this public enterprise in Algeria. Then, statistical tests, using the MINITAB software, were carried out in order to study the relationship between the female work productivity and the factors generating this productivity.

The results of these surveys have shown that a dozen factors (example: training, stress, motivation, remuneration, internal communication, etc.) are clarifying the female work productivity within this public enterprise. In addition, these factors allow, not only, the improvement of the performance at work and the management of the female staff (the reactivity of the information, the internal communication, the behavior of the personnel, the stress, the need, the motivation, the absenteeism, compensation ...), but also the increase in the female work productivity within this company.

Due to the presence of process and concept like organizational citizenship behaviour (OCB) has witnessed the increased the working efficiency of various organizations as it promotes positive working environment and increases productivity of work and increases efficiency of working employees and promotes harmony and positivity.

Keywords: Human Resource Management, Performance at Work, Management of Female Staff, Work Female Productivity.

INTRODUCTION

The modeling serves as a breadcrumb for a reflection on the roles and tasks of each. It also supports the development of procedures to improve the quality of service [01], taking into account the innovation of the process, which is a basis for calculating the costs of multiple services composed of different activities carried out by people.

According to DEFELIX [02], the innovation developed by people must be better managed and he insists on the importance of human capital in the innovation of the Human Resource Management (HRM) while aligning the company's

strategic objectives. In the same vein, DEFELIX, MAZZILLI AND GOSSELIN [03] underline this importance by numerous researches and which are concentrated on large companies, less nothing; LAURSEN and FOSS [04] mark certain incomprehension in the mechanisms which connect HRM and innovation, which insist on studying studies through the profile of managers for HRM and innovation.

Advanced studies show the link between HRM and the performance of an organization. The latter shows great interest both for academic research and for professionals. According to Kenneth KERNAGHAN (2001) "values remain the unifying force of organizations with a strong identity, in

such cases it is a value system with which employees identify themselves, under which they are ready to commit and from which a feeling of pride and loyalty to the organization will flow” [05].

Otherwise, the improvement, the increase as well as the control of the productivity of work, within this public operator of the Telecom sector, is through decisional latitude which gives motivation to the staff of the commercial agencies. But also with satisfaction of the needs of these workers and social support between colleagues and the hierarchy which reduces stress and improves this work productivity [06].

In this context, the problem that should be posed and for which we will try to provide elements of answers is as follows:

What are the determinants of the female work productivity in a public enterprise in the Telecom sector in Algeria?

The theoretical and conceptual anchoring :

The theoretical framework of our work is unexpected from the school of human relations. Indeed, it is with the interaction with the excesses of Taylorism that this school has developed, giving an outcome in search of the productivity of work and which has engendered behaviors contrary to its initial objectives. However, the organization's approach is evolving by integrating a new dimension: Man as an individual and a member of a group.

We were inspired by a certain number of theorists, in order to apprehend our research within a public company of the Telecom sector in Algeria, but also, to arrive to interpret which can give a theoretical and practical meaning to our results. Indeed, the key concepts that need to be clarified are:

In his founding article of the mental tension model, KARASEK (1979) explains the elements important to consider understanding the reasons for a possible excess of stress in relation to work. As such, three elements can be examined: the workload, the room for maneuver of the worker and the professional support from which he benefits. The workload is all the stronger when the time and resources (material, informational, financial and symbolic) available to the worker are limited. As such, the KARASEK questionnaire is considered to be the most no longer used in the assessment of work stress. The model originally developed explored two dimensions: psychological demand and decision latitude. The psychological demand relates to both quantitative and qualitative aspects of the psychological workload. Latitude

has two sub-dimensions: the use of skills and autonomy decision-making.[07]

The XY theory of McGregor, Douglas. Indeed, the author supports his argument by basing his analysis on the hierarchy of needs developed by the psychologist Maslow (1954) in order to explain the inadequacies of theory X as a limit of its merits. He sums up the motivation of man as follows: "Man is an animal that has needs, as soon as one of its needs is satisfied; another appears in its place. This process is infinite and it takes place from birth to death "[08]

Behavior is defined according to SAVALL and ZARDET as "a set of manifestations of man actually observed and which affect his physical and social environment". According to Leavitt, the behavioral processes are similar for all individuals. He underlines the presence of three elements which are simultaneously interrelated: the behaviors caused, motivated and oriented by the objectives. [09]

The temporal perspective makes it possible to distinguish transactional satisfaction (at an instant t) from relational satisfaction (accumulated over time). Transactional satisfaction is an immediate post-purchase evaluation, an emotional reaction to the last transaction with the company (Garbarino and Johnson, 1999). This judgment results from a comparison between the experience perceived by the client and his expectations; this comparison process corresponds to the paradigm of dis confirmation of expectations (Oliver, 1980) [10]

Given the multidimensional nature of the concept of performance it is difficult to define it precisely [11]. As pointed out by A. SAUCIER (2006) [12] "The concept of performance must therefore also be clarified each time we want to use it". For our part, it is necessary to specify at what level of analysis the concept of performance must be approached. So, the individual performance which concerns the individual within the framework of his work station interests us to explain performance through skills, training and learning. Because there is no consensus in the literature to explain performance, the Prospective Dashboard as an analysis grid can be used to help organizations to implement their strategies (KAPLAN and NORTON 1992, 1996) [13]. These offer four (04) levels of measures:

financial performance measures : they indicate the level of success of the strategy in terms of financial objectives;
measures related to customers : they focus, mainly, on the satisfaction that the company brings to its customers;
measures related to "internal processes: they describe the

organizational results generated by the internal components of the company;

measures relating to learning and development: This type of analysis gives particular importance to individual performance from a learning and development point of view.

According to Donald KIRKPATRICK (1959), training performance is explained on four levels: The first level talks about the course of the training (the quality of its content, its animation, and logistics deployed, etc.). The second concerns the degree to which the educational objectives have been achieved in terms of knowledge, know-how and interpersonal skills. The third level is related to the professional behaviors implemented during real work situations. The fourth level of performance relates to the organizational results brought about by the same learner. This model was partially validated by J. LE LOUARN and POTTIEZ (2010) [14] in their article "partial validation of the KIRKPATRICK training evaluation model". In these articles by the two authors they approved the causal relationship which is primarily in the assessment of learner satisfaction and the degree of learning in order to know the improvement of behavior in the workplace is a function of learning from training. They have managed to demonstrate that "Satisfaction with the content of the training and a positive state of mind before the training are necessary conditions for learning". But also, "improving the behavior of learners in the workplace depends on the transfer conditions more than the learning itself". The authors cite four conditions with regard to the learner which are:

- The learner considers the training to be interesting,
- Has the means to apply what he has learned,
- To give him the opportunity to apply his learning,
- The work environment is supportive.

In this context, we can say that these previous conditions should be part of the training management process.

SCHEIN's anchor theory (1978, 1990, 1996) [15] can provide a better understanding of the patterns behind the construction of motivations for the formation of a voluntary ceiling which is not a classic phenomenon in an environment where ambition is valued in its everyday expression. Indeed, mobility and progression, that is to say the motivations and needs relating to the career. For Schein, these represent one of the most important since it concerns the assessment that the individual will make in relation to his professional activity and what he wishes to gain from it.

An individual can be seen as a success for the company through consistent, sustained work productivity. If the objective of the individual is linked to his professional life

and not only to his private life, if this individual wishes to remain in a position because the latter fulfills one or more of his expectations in the professional field which seems to be an important element and which can be an asset for the company by motivating him to stay in his job through training. SCHEIN's career anchors (1978, 1990, 1996) [16] can provide useful elements in order to better understand what can motivate an individual not to change jobs. The latter allow, according to Schein, "to study the dominant motivations which are the basis of a career orientation". As a result, Schein identifies three dimensions that could be described as "self-assessment", and eight career anchors that are more specific to the expectations expressed regarding the career. For the three dimensions of self-estimation we find:

- Estimation of his talents and aptitudes: it is the conception of his own capacities, acquired and potential
- Motivations and Needs relating to the career: it is the balance sheet of the professional activities of the individual acquired what he wishes to draw from this balance sheet.
- Basic values: it is the set of values sought that the individual defends them.

CERDIN and Le PARGNEUX (2008) [17] note that: FELDMAN and BOLINO group Schein's eight anchors into three categories which are close to Schein's "self-concepts". The first "talent-based" dimension concerns "talents" and one finds there the anchors of technical / functional skills, general managerial skills and entrepreneurial creativity. The latter make it possible to determine what type of work would be suitable for individuals so that they can express their know-how. In the second dimension "need-based" is found in the three anchors security / stability, autonomy & independence and the lifestyle which correspond to expectations, needs and what motivates the person. The third dimension concerns "value-based" is found in the last two anchors, service and devotion to a cause as well as pure challenge and challenge will more reflect the attitude of a person as well as his values.

RESEARCH METHODOLOGY

In order to try to provide an answer to our problem, we opted for two research methodologies. The first methodology is general; it concerns the DMAIC which is part of the SIX SIGMA. As for the second methodology is particular and it is unexpected from the research studies of YIN (2003, 2009).

DMAIC methodology and organization:

Before proceeding to identify our factors, we must, first of all, explain how we arrived at this tool. Indeed, this

methodology falls within the framework of SIX SIGMA which uses several quality tools. Within the framework of our work, we are satisfied only with the first three stages of this approach, Define the statement of the problem and its perimeter, Measure the process of female work productivity and its linearity and finally, Analyze the process female work productivity with hypothesis tests to test the factors and confirm them with our hypotheses.

METHODOLOGY AND ORGANIZATION of YIN (2003, 2009):

Our research methodology based on the Yin case study (2003, 2009)[18] whose objective, not only to explain the presumed causal links of a phenomenon based on a problem, but also to describe the context of this phenomenon in the discovery of new causalities and / or results.

The instrument chosen for carrying out our study is the "questionnaire", which is the instrument most, suited to our problem. It is an extremely flexible instrument due to the variety of responses that can be chosen. Our questionnaire is mainly composed of three types of questions [19]:

For questions relating to the measurement of satisfaction, we have chosen to base ourselves on the LIKERT scale, which represents an assessment scale of four (04) levels in relation to each item of this construct (satisfaction).

For the questions relating to the measurement of work productivity, we chose closed questions (dichotomous), where the respondent must choose very specific answers, example: yes / no.

To highlight the most important elements for internal customers, we used multiple choice questions.

In this part, the study consists in evaluating the factors determining the perceived quality of the content of the training offered by this company in its educational aspect but also, the development of female skills.

In addition, the results obtained in this part are summarized in tables and figures, which will be useful to us in our descriptive analysis of the facts, by calculating a weighted average which agrees with all the answers obtained as follows:

$$\bar{x} = \frac{n_1x_1 + n_2x_2 + \dots + n_px_p}{N}$$

- n: the number of respondents for each measure.
- N: the total number of respondents.
- xi: 25%, 50%, 75% and 100%

On the other hand, the measurement tool is fixed at (62.50), represents the weighted average, that is to say:

$$H0: [(0 + 25) / 2 + (25 + 50) / 2 + (50 + 75) / 2 + (75 + 100) / 2] / 10 = 62.50$$

The measurement scale			
(1) Dissatisfied	(2) Moderately Satisfied	(3) Satisfied	(4) Very satisfied
[0-25% [[25% -50% [[50% - 75% [[75% - 100% [

The Telecom sector in Algeria is constantly and constantly evolving. In fact, at the microeconomic level, and following the establishment of multinationals which represent significant potential competition, the Algerian public enterprise must develop strategies and bring the operating mode to international standards to keep its market share, current internally and possibly on international markets.

At the macroeconomic level, knowing that the Telecom sector today constitutes a key element for the economic activity of the country, [20] with 42.2 M inhabitants, Algeria is the fourth economy of the African continent, the second in North Africa after Egypt, and represents the first market for telecommunications on a Maghreb scale.

After several years of stagnation, the telecommunications sector has experienced major revolutions in recent years which offer multiple development opportunities to companies.

The evolution of the number of subscribers to fixed telephony in Algeria, tends in recent years towards positive growth. In 2018, this number reached more than four million subscribers. In 2017, it was decided to eliminate the technology of fixed wireless telephony (WLL), intended for rural areas, this is in line with the strategy of the State aiming to provide these areas with a more efficient communication infrastructure like 4GLTE, fixed telephony subscriptions have always been dominated by residential subscribers, who in 2018 represented a rate of 74.44% of total subscribers. The number of professional fixed telephony subscriptions is increasing compared to 2017. The penetration rate of fixed telephony to households has reached more than 50% since 2017. In 2018 51% [21].

SAMPLING AND DESCRIPTIVE STATISTICALS:

Sampling:

The results obtained in this part are summarized, which will serve us in our descriptive analysis of the facts, by calculating a weighted average which agrees with all the answers obtained, but also to model the productivity of female work. a series of surveys that have been carried out on female samples working in commercial telecommunications agencies in the wilaya of Algiers (the capital of Algeria) .The latter all replied, these samples belong to varied numbers, these surveys were developed during the two years 2017 & 2018 as follows:

A survey carried out during the period from October 16th to 25th, 2017, the purpose of which is to verify and assess the quality of training received by female staff at the level of commercial agencies in the public enterprise of the Telecom sector in Algeria. It should be noted that the questionnaire was sent to a sample of 204 women from telecommunications agencies in the wilaya of Algiers (the capital of Algeria), who all replied. [22].

A second survey carried out between 09th and 23rd May 2018 which aims to verify and assess the degree of mastery of female staff at the level of commercial agencies in the public enterprise of the Telecom sector in Algeria. It should be noted that the questionnaire was sent to a sample of 216 female people in telecommunications agencies in the wilaya of Algiers (the capital of Algeria). They all replied.

A survey carried out from February 04th, 2018 to February 18th, 2018 which consists in particular of verifying the behavior of our female agents by the level of satisfaction recorded by General Customers. The elaborate survey reveals the results from the examination of the questionnaires. It should be noted that the questionnaire was sent to 1000 customers, they all replied, the questionnaire survey concerns a set of telecommunications agencies in the wilaya of Algiers (the capital of Algeria).

Another survey done, on December 10th to 19th, 2018 consists in particular, verifying and evaluating the internal communication of telecommunications agencies. The elaborate survey reveals the results from the examination of the questionnaires. It should be noted that the questionnaire was sent to a sample of 175 women from telecommunications agencies in the wilaya of Algiers (the capital of Algeria).

A survey carried out during the period from 14th to 24th November 2018 consists in particular of checking and

assessing stress, need and motivation at the level of telecommunications agencies. The elaborate survey reveals the results from the examination of the KARASEK questionnaire. It should be noted that the questionnaire was sent to a sample of 177 female people from telecommunications agencies in the wilaya of Algiers (the capital of Algeria), the latter all replied.

Descriptives Statistics :

variables	The results	comments
Satisfaction with the educational aspect	69.73%	The operator Telecom, scores an average of 69.73% depending on the respondents' point of view on the quality and content of the training. It is an explanatory value of the satisfaction of the agents, because the average obtained is higher than the average fixed for the measurement of the results which is theoretically fixed at (62.50%).This means that training is very important for improving the knowledge of female staff but also increasing the productivity of female work.
General appreciation of the content of the training	64.70%	The public telecommunications operator records an average of 64.70% compared to the point of view of the respondents on the assessment in relation to the development of skills of the female agents of the front office of the company. This is an explanatory value, because the average obtained is higher than the average fixed for the measurement of the results which is theoretically fixed at 62.50%. This means that the development of the skills of female workers in this company is linked to the right choice of training, because training in this company is very important for the development of their skills.

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<p>Satisfaction with the technical quality of services</p>	<p>67.94%</p>	<p>The operator Algerian Telecom Sector, scores an average of 67.94% depending on the respondents' point of view on the technical quality of the offers and services. This is an explanatory value for customer satisfaction, because the average obtained is higher than the average set for the measurement of results which is theoretically fixed at (62.50%), which explains why the operator offers satisfactory services in the eyes of customers which brings us back to transactional satisfaction.</p>			<p>explains the satisfaction of the agents, because the average obtained is higher than the average fixed for the measurement of results which is theoretically fixed at (62.50%), which explains why the female agents of the agencies commercial have good communication of information which brings us back to say according to Kurt Lewin that the company takes into consideration the environment especially the factor the internal communication policy.</p>
<p>Satisfaction with relationship or behavioral quality</p>	<p>62.76%</p>	<p>The operator Algerian Telecom Sector marks an average of 62.76% according to the point of view of the respondents on the assessment in relation to the quality of contact that the female front office agents provide for the operator's customers. This is an explanatory value of customer satisfaction, because the average obtained is higher than the average fixed for the measurement of results which is fixed theoretically (62.50%), which explains why the female staff of the commercial agencies of Algerian Telecom Sector does its best to give satisfactory behavior to customers and satisfy them, which brings us back to relational satisfaction, and therefore these agents result in good work which leads us to better productivity of female work.</p>	<p>Assessment of work productivity in terms of reactivity</p>	<p>64.56%</p>	<p>The operator Algerian Telecom Sector marks an average of 64.56% according to the point of view of the respondents on the productivity of female work in terms of the responsiveness of the front office of Algeria Telecom. It is a value which is explanatory, because the average obtained is higher than the average fixed for the measurement of the results which is fixed theoretically (62.50%), which explains that there is a fairly high satisfaction of the agents the responsiveness or speed of the hierarchy to inform these subordinates or collaborators.</p>
<p>Satisfaction with internal communication</p>	<p>72.35%</p>	<p>The operator Algerian Telecom Sector, scores an average of 72.35% depending on the respondents' point of view on communication to accomplish the tasks of female agents. It is a value which</p>	<p>The motivation of workers</p>	<p>68.45%</p>	<p>The operator Algerian Telecom Sector, scores an average of 68.45% depending on the respondents' point of view on the motivation of female workers. This is an explanatory value, because the average obtained is higher than the average fixed for the measurement of the results which is theoretically fixed at (62.50%), which we confirm the theory of McGregor on the motivation of female workers and also what brings us back to say that: if each agent makes</p>

		decisions then the latter will be motivated, provided that their hierarchy adheres.
Satisfaction with workers' needs	69.69%	The operator Algerian Telecom Sector, scores an average of 69.69% depending on the respondents' point of view on satisfaction with the needs of female front office workers. It is an explanatory value of the satisfaction of the agents, because the average obtained is higher than the average fixed for the measurement of the results which is fixed theoretically (62.50%), which explains why strong hierarchical tension makes female agents more stressful at work but they are satisfied in their needs.
Social support from colleagues and superiors	68.42%	The operator Algerian Telecom Sector, scores an average of 68.42% depending on the respondents' point of view on social support to accomplish the tasks of female agents. It is a value which is explanatory of the satisfaction of the female agents, because the average obtained is higher than the average fixed for the measurement of the results which is theoretically fixed at (62.50%), This means that if there is mutual support between colleagues or by superiors, the company will notice an increase in the productivity of female work.
Compensation (remuneration)		The number of male directors (30) at the level of the company is higher than the number of female directors (04) at the level within the same company what we can say that there may be some discrimination in the diversity management or women do not prefer to occupy such positions for lack of great responsibility

		which leads us to say that men remunerated better than women.
Absenteeism		On average we find that The absenteeism rate for women, 2.74%, is higher than for men, 2.19%, during the 10 years.

PROPOSAL OF A CALCULATION MODEL FOR THE FEMALE WORK PRODUCTIVITY:

In order to design an experiment plan and identify our calculation model for the female work productivity for an expected result is which is a better quality response variable. The latter can mean improved or satisfactory female work productivity. To this end, test factors likely to influence this productivity and which must be identified. In our case the generating factors are the following:

A /The operator offers a satisfactory quality of service to its customers. B / The behavior lead to better work productivity. C / Access to information make it easier to complete tasks on time. D / Reactivity of information increases work productivity. E / The operator offer well-adapted training to improve performance and increase productivity, F / Training is an effective tool for skills development. G / The decision-making attitude give motivation to the workers. H / Psychological demand at work leads to meeting the needs of workers. J / Social support from colleagues and workers improves the production of work. K / Absenteeism. L / remuneration.

For our experience, we will use a screening plan to deal with the different factors, to configure the desired plan, under MINITAB. Resolution is the degree of effect alias for other effects. In other words, effects with aliases are mixed and cannot be estimated separately. This phenomenon can also be referred to as confusion;

Once the screening plan is created, MINITAB automatically randomizes the trial order of the experiment. Randomization balances the effect of out-of-control conditions, such as changes in equipment or personnel, and reduces the risk that these conditions will not bias the results. When we perform the screening experiment, we make sure to perform the tests in the random order specified on the worksheet.

We proceeded to the screening plan after having carried out all the pre-experimental activities, then entering the response data (female work productivity), and then adjusting the screening model to first identify the critical factors to be introduced into the modeling plan and bring out a calculation model.

MINITAB automatically set our screening experiences for the 11 factors (Variables) for a number of twenty (20) trials.

It should be noted that the female work productivity is fixed by the public enterprise of the Telecom sector in Algeria as follows:

Table N ° 01: Parameters relating to the female work productivity

Settings	MINI parameter (-)	MAX parameter (+)
Female work productivity	30 %	87%

Regression equation in uncoded units:

WORK

PROD

$$FEM = -724 - 0.772 A + 30.0 B + 0.792 C - 8.16 D + 0.913 E - 8.73 F + 1.001 G - 1.001 H - 1.318 J + 4.80 K + 3.30 L$$

Optimization of responses : WORKPRODFEM

Solution:

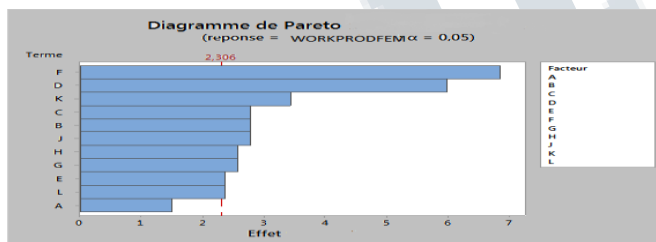
Solution	B	VS	D	E	F	G	H	J	K	L
1	62.76	72.35	62.5	69.73	62.5	69.69	62.5	62.5	High	High

Source: development ourselves

Design of the experience plan for female work productivity:

After entering the data into MINITAB, we found the following results:

Figure N ° 01: PARETO diagram of standardized effects of female work productivity



Source: develop by ourselves using MINITAB software

Significant factors are those that influence response when the parameters are changed. In our case the significant factors are B (behavior leads to better work productivity) up to K (Absenteeism), parameter A (The operator offers a satisfactory quality of service to its customers) is excluded because it is not significant when the risk of error $\alpha = 0.05$ according to the PARETO diagram

Summary of the model:

S	R ²	R ² (adjust)	R ² (prev)
9.96795	83.40%	68.46%	33.59%

The R2 is greater than 80% which explains that our model is good and that we can perform a linear regression as follows:

Solution	WORKPRODFEMA djusted value	Composite Desirability
1	106.8	1

Multiple responseforecast:

Variable	Configuration
B	62.76
VS	72.35
D	62.5
E	69.73
F	62.5
G	69.69
H	62.5
J	62.5
K	High
L	High

Reply	Adjusted value	Erat typeajust	95% CI	95% PI
WORKPRODFE M	106.80	4.96	(95.57; 118.03)	(87.95; 125.65)

Based on the data we have collected, our analysis using MINITAB software reveals the following optimal parameters:

With a minimum (low) of female work productivity the public enterprise must act only on the following variables : D / The reactivity of information makes it possible to increase the productivity of work, F / Training is an effective tool for the development of skills, H / Psychological demand at work leads to meeting the needs of workers, J / Social support between workers improves the production of work.

And with a maximum (high) of female work productivity the public enterprise must act as a priority on the following variables: K / Absenteeism, L / compensation, B / Behavior leads to better work productivity, C / Access to information makes it easier to complete tasks on time, E / The operator offers training well suited to improve performance and increase productivity, G / The decision-making attitude gives motivation to workers.

CONCLUSION:

The results of our study on the modeling of female work productivity in a public company in the telecoms sector in Algeria show that there are two levels of minimum and maximum productivity. Each of these two levels is determined by its own factors. On the one hand, for a minimum level of productivity, the company must act only on the variables: The reactivity of information, the effectiveness of training for skills development, psychological demand at work and social support between workers.

On the other hand, for a maximum level of productivity, the company must act, in addition to the variables mentioned above, on the following variables: Absenteeism, remuneration, behavior between workers, and access to information to make it easier to complete tasks on time, the provision of well-adapted training and the decision-making attitude that gives motivation to workers.

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