

## Using simulation and modeling to improve career management processes in organizations

**Nicoleta Valentina FLOREA**

“Valahia” University of Targoviste, Romania  
floreanicol@yahoo.com

**Abstract.** *Career is a footprint of past accumulated experiences linked by different events: objective events (filling certain jobs, positions, functions, tasks, responsibilities, activities, decisions), and subjective events (beliefs, aspirations, expectations, values, needs and feelings) related experiences in a specific occupation, in time in organizations, that can change the course of a person's life.*

*And because the career management requires obtaining new knowledge, experiences, skills, competencies, and because they can lead to achieving competitive advantage on the market, we aimed to show the role and the importance of such a process in organizations and to analyze its stages and their influence on career choice. Also, we intend to analyze the influence of some internal and external factors which could have on the effectiveness of career development, using a simulation model in order to see the strength of their relationship between the analyzed variables and of their impact.*

**Keywords:** career management, internal and external factors which influence career, simulation, modeling, performance.

**JEL Classification:** C15, C53, J24, M54.

## 1. Introduction

Career is a relatively a recent concept, resulting from the development and the organization change during sec. XX. Organizations who offer a career planning will obtain performance (Florea, 2015, p. 151). To have a longer-term career, the employees need to develop their skills and knowledge through education, training, or employment contexts (Alrumani et al., 2014, p. 216). Most of the managers feel that knowledge is the most critical asset of their organization (Florea, 2014), that is why the individual must acquire the necessary stock of knowledge, skills and experience in order to develop a career. And because the human resource is the most vital and valuable resource for any organization (Olcer, 2015, p. 112), it must motivate it by investing in its career.

To observe its importance, for the individual but also for the organization, we offer some definitions given by experts in the field:

- traditional career presupposes a series of movements with increased responsibility, status of development (social position) and wage (Jackson, 2000, p. 5):
  - career is defined as a process by which individuals progress over several stages, each being the characteristic problems, certain terms or tasks (Godshalk and Callanan, 2010). Given that each person is unique experiences through our knowledge, the posts and the position occupied, then each will have a unique career (Godshalk and Callanan, 2010);
  - career is a sequence of activities and professional positions of a person and the skills, knowledge and competencies associated that develops over time (Deaconu et al., 2004).
- one of the most popular definitions of career was that it should be assessed by the number of promotions (horizontal movements) over a lifelong career of individuals (Schrender and Coetze, 2007, p. 56);
- the concept of career into the XXI century is not only moving up the professional scale, but also movement both vertically and horizontally, linear motion, cyclic and static (Koster, 2008, p. 6). Individuals, no matter the age, must pay great attention to career management, to not affect their personal lives, but bring them success and satisfaction (Godshalk and Callanan, 2010).

Hall (1976) indicates that there are four different significations associated with the concept of career (Schrender and Coetze, 2007):

- career as advancement;
- career as a profession;
- career as work experience;
- career as life experience.

## 2. Career management – definition and importance in organizations

Carrer management links employer designs and administers career programs to amalgamate employees' interests and capabilities with organizational opportunities (Ismail et al., 2014, p. 152).

Currently, in organizations:

- there are flatter structures and have fewer opportunities for promotion;
- job security is a thing of the past. The only real form is to be engageable, meaning to have the own knowledge, skills and professional reputation required at any time by the organizations (Deaconu et al., 2004).

Understanding career management is important from two points of view (Godshalk and Callanan, 2010):

1. helps individuals to effectively manage their career,
2. organizations can benefit from understanding the career management process and decisions taken on their employees.

Using this career management, the organizations offer opportunities for employees for a challenging job and for obtaining organizational performance, through stimulation and creation of interesting jobs. Challenging jobs provide an opportunity to strengthen, develop, and learn skills applicable to the world (Greenhaus and Callanan, 2006, p. 413).

Career management is defined as a process by which employees obtain knowledge, job opportunities, achieve career development goals, objectives, implement strategies and is testing processes, obtaining feedback on the effectiveness of strategies and relevance of the objectives (Schrender and Coetze, 2007, p. 59). Career development is a process by which individuals are progressing and going through a series of stages, each characterized by unique problems emerged, themes or tasks (Schrender and Coetze, 2007, p. 59).

The cycle of career management consists of (Greenhaus and Callanan, 2010, p. 48):

- Setting goals,
- Develop and implement a plan or a strategy,
- Feedback required to provide information for career management.

The significance of career (Yarnall, 2008, p. 384):

1. Having a job and the quality to be an employee of an organization- career describes under this point, a job itself or what an employee is doing in an organization.
2. Advancement- career as this point is representing the progress or success it has an employee in an organization.
3. Status or profession- from this point of view, some people which are holding different functions, some have a career, others have a profession.
4. Involvement in work- the term of career is sometimes used negatively to describe that is very involved in what is doing.
5. Stability-a job can describe the entire career that took over time when another job not.

### 3. The relationship between career and the stages of human resources development

Employee career management must start from knowing the stages of development and their specific needs (Figure 1), while differ greatly from one person to another. Consequently, the development and implementation of a career development plan will be based on the employee appreciation program for employees, to be able to offer a more complete picture of the potential and performance.

## **Career stages and their characteristics**

### **16-22 Exploration**

The young employees explore different occupations and they are testing a new organizational identity. They develop their skills, are establishing a social network and relationships with mentors, facing emotional demands at the beginning of career (Deaconu et al., 2004).

Levinson believes that 25 years ago, when a young person was finding a job, he/she faces with two potential conflicts (Godshalk and Callanan, 2010):

- to explore adulthood by playing different roles, but still keep options opened;
- to get married and have a stable life.

This stage is a time of discoveries and choices, in which young people have many ideas, struggling with questions such as: what they want to do and what is possible to do in terms of professional occupations.

### **22-32 Gaining and fixing**

This step is consisting in effective completion of two stages.

- *Stage 1- by gaining experience.* The individual actually contributes to consistent performance in the organization, and will have a specific area of expertise. Passing through the conflicts between the professional role and non-professional role and prepare a plan for achieving professional goals (Deaconu et al., 2004). Beginning of the 30s is a period of transition, the young adult it develops and refines and at 35 years the young employee has two significant goals (Godshalk and Callanan, 2010): to build a professional niche in the actual society and to build a better personal life.
- *Stage 2- by stabilization.* This stage involves stabilizing the subject in a given field of activity. At first, people are inclined to deal with several activities. Stabilizing career involves setting priorities and focus on core activities. Now appears the need to remove from the mentor. If individuals have not developed solid skills before, the contact with independence, with the situation of not having someone to check them out can cause insecurity. The conflict between professional and non-business role may become a problem (the balance profession-family). So, the conflict between the roles requires an additional investment of time and energy.

### **32-55 Advancement and maintaining**

The employee is focusing on the present, and for many, it's becoming clear that this position is the highest in their career and that few promotions may occur. He/she may become a mentor (Deaconu et al., 2004).

In this stage, the employees are focusing on:

- achieving professional objectives;
- maintaining organizational progress;
- reanalyzing the career plans through the prism of made progresses;
- recalculation of relative professionals and non-professionals roles;
- advancement to key-objectives of their career;

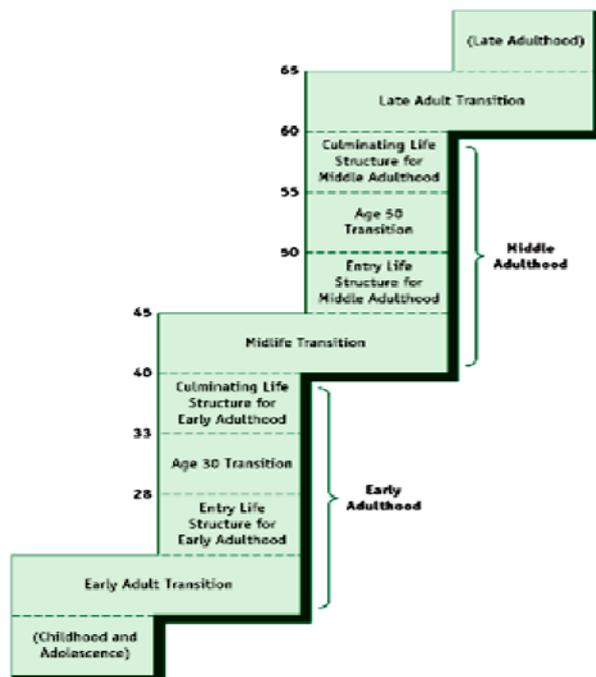
- according concern for maintain a certain status or position;
- preparing the options for the future career ending;
- maintaining the skills and interests already obtained and proved;
- assuming the mentor or coach responsibilities;
- finding the satisfaction to train the new generation.

In this period of middle 40 years, Levinson considers that 80% of men and 85% of women have passed through this transition period dominated by following a dream: that of professional development, through a hard struggle, due to vigor loose and increasing thought for mortality, and the desire to make something to last, because he/she is already to the half distance of life and the necessary experience to achieve that dream (Godshalk and Callanan, 2010). The period of 50 years is dedicated and is based on work.

### 55- retirement; late career

Usually, it was reached the highest position and people begin to devote more energy to extraprofessional purposes. The main source of their contributions is the area of their knowledge and experience. The role of mentor can continue this stage. For some, the end of the career is an increase in status and influence within the organization; for most, it is the moment when they have achieved or are on track to achieve the highest level of responsibility and status. In this stage are appearing signs of aging and health problems. The thought of retirement and reduced income can be a source of anxiety and of diminution of professional efforts. Some may however continue to exercise activity as mentor.

**Figure 1.** *Stages of career development*



Source: Greenhouse et al., 2009, p. 31.

Depending on the results of the assessment, human resources development plans will be customized for each employee in relation to a company's future needs in terms of workforce (Radu et al., 2003).

#### 4. Analyzing the impact of internal and external factors on career development

Career development depends on internal and external factors.

These factors may be:

- Internal: setting goals, designing strategies, leadership style, financial force, feedback from different people or organizations work programs during the day, holding another job, internship programs, counseling programs from colleagues, performance assessment, workshops plants, mentoring, training offered by organizations, support from family and friends, etc.;
- External: the evolution of the labor market, the degree of competitiveness, the unemployment rate among young people, duration of work life, evolution of the number of young people living in families with low labor developments in government expenditure which are career development, with education, with learning along life or annual labor costs, etc.

In this article we intend to analyze the influence it can have some of these factors, using mathematical modeling and computer simulation.

We intend to analyze three situations in which six internal and external factors (internal factors: lifelong learning, hours worked per week of full time employment, employed persons with a second job, external factors: labor costs annual data, employment rate, by highest level of education attained, employment rates of recent graduates) may act on the evolution of employees career development. To see the importance of the three chosen cases, we will shortly describe them, in order to show their relevance and their influence on career, through the prism of some views of specialists in the field.

Employees, to have performance and to face the changing environment, need to keep updating and building on continuously their existing skills stock. Career development highlights the importance of training and lifelong learning, which are important channels for gaining transferable skills and add value (OECD, 2012, p. 36). The changing macro-environment emphasizes that we are in an era „do-it-yourself”, and the individuals play a great role in creating their own career development, becoming „life designing” (Patton and McMahan, 2014, p. 8). Younger employees are encouraged to develop their skills focusing rather on employability than job security, requiring assistance to learn and to find their direction and evolution of their own career (McDonald and Hite, 2015). To be secured, they must gain skills and new knowledge; thus career development is viewed as multi-directional and multi-leveled. So, lifelong learning is an area of educational position (Lee, 2007, p. 362).

In this new era, young employees were found to have the highest unemployment rates. This problem is serious both for male and female (Rahim et al., 2005, p. 28).

As we may see, these factors are described below and we can see their trend along the past years: the unemployment rates of the population are raising from 14,1 in 2010 to

16,3 in 2015 (Table 1), the duration of working life is raising from 34,4 in 2014 to 35,3 in 2014 (Table 2), and the young people are affected in this new environment, by increasing the ratio of youth unemployment from 6,9 in 2007 to 9,1 to 2015 (Table 3) and by the fact that young people are living in families with very low work intensity is increasing too, from 9,4 in 2005 to 10,6 in 2013 (Table 4).

**Table 1.** *Unemployment rates of population*

**Table 2.** *Duration of working life*

**Table 3.** *Youth unemployment ratio*

**Table 4.** *Young people living in households with very low work intensity*

Year	Unemployment rates of the population (EU 28)	Year	Duration of working life	Year	Youth unemployment ratio	Year	Young people living in households with very low work intensity
2010	14,1	2009	34,4	2007	6,9	2005	9,4
2011	14,7	2010	34,5	2008	7	2006	9,7
2012	16,7	2011	34,7	2009	8,9	2007	8,8
2013	17,9	2012	35	2010	9,5	2008	8,3
2014	17,4	2013	35,2	2011	9,7	2009	8,3
2015	16,3	2014	35,3	2012	10,4	2010	9,4
				2013	10,7	2011	9,9
				2014	10	2012	10,4
				2015	9,1	2013	10,6

Source: appsso.eurostat.ec.europa.eu

Training and career development are influenced also by the manpower planning (which involves forecasting the compensation costs) and by the developing of skills, abilities, and knowledge (which affect positively their capacity to efficiency, earning, etc.) (Prakashan, 2009, p. 9).

The segmentation of the labor market (part-time employees, unemployment) may induce lower hourly remuneration, poverty traps, lower productivity, lower labor costs, insufficient access to training and lack of career development, negative consequences for women and other workers already at a disadvantage in the labor market (Gomez-Salvador et al., 2005, p. 305). So, it is important to develop policies to diminish the gap between the type of jobs actually offered by organizations and workers relative preferences for part-time or full-time employment as well as that of equal opportunity between full-time and part-time employees. When labor costs are added to running costs, it is not the most efficient way of running an organization (Ali and Graham, 2002, p. 18). Active labor-market policies need to be examined to determine if they help people who have particular problems in finding a job and become more employable (Weller, 2009, p. 12).

## 5. Research methodology

### Research objectives

This article is analyzing the influence could have some factors, internal or external, called independent variables on duration of employees career, called dependent variable, using modeling and simulation studies.

In our paper we have also proposed to demonstrate that analyzing the connection between these factors, the organizations may improve the process of career development by using good motivation practices (financial and nonfinancial), effective working programs, and decreasing the rate of unemployment.

The research was made using data and information from eurostat.com data presented on its official site (data collected from 28 European countries).

*Tools for data collection:* observation and data analysis.

*Tools for analysis:* modeling and simulation scheme, linear regression function, Excel program (R calculation, ANOVA test).

### Data presentation and analysis

The research was made on data from the official site of eurostat.com, and we wanted to analyze the impact could have some internal and external variables on career duration of an employee, taking into account some factors presented below.

Regression analysis is essentially a method that allows predictions, in our case to estimate the value of a variable (Y) when we have an associated variable value (x). We are interested to know if in the three cases, the two chosen variables are associated and to determine the degree of association between them.

#### Case 1

We analyze the impact could have two independent variables (x1- lifelong learning, x2- labor costs annual data) on dependent variable- employee career (y-duration of working life).

**Table 5.** Data regarding LLL, LCA and DWL

Year	Duration of working life DWL (y)	Lifelong learning (LLL) (x1)	Labor costs annual data (LCA) (x2)
2010	34,6	9,1	21,5 <sup>(2008)</sup>
2011	34,7	8,9	21,5 <sup>(2008)</sup>
2012	35	9,0	23,9
2013	35,2	10,5	24,2
2014	35,3	10,7	24,6

Source: eurostat.com

It can be estimated that between these variables there is a direct and linear connection. Based on the data presented, and using Excel- Data Analysis, were obtained the following results (Figure 2). After the form of the points position, results that there is no correlation between the independent variables and residuals, the model being well chosen. Thus, in our case study we used regression function and Excel to analyze if the factors presented above have some influence on employee career duration of employees.

Multiple R is the multiple coefficient of correlation between  $X_1$ ,  $X_2$  and Y (Table 6). Between the value  $X_1$ ,  $X_2$  and y there is a direct and strong enough connection due to the amount obtained by Multiple R (0.999007).

R square means that 99.8016% of the variance in the dependent variable Y is predicted or explained by the independent variables  $X_1$  and  $X_2$ .

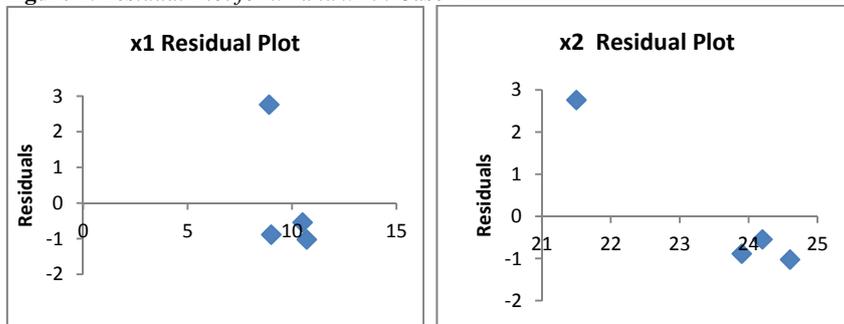
The strength of the linear relationship between variables is measured by the simple correlation coefficient (Araghinejad, 2013, p. 51), so the  $R^2$  show a value of 0,998, which is very close to 1 indicating that the most of the variance in the dependent variables originate in the variation of the regressors, as propagated through the model.

Adjusted R Square is a coefficient of determination corrected with the freedom degree having the same signification as  $R^2$ .

Standard Error shows the average of the values observed deviate from the theoretical values  $y_i$  of the regression line,  $Y_i$  (in this case with  $\pm 2,208$ ).

Observations are  $n$ , the number of observations,  $n = 4$ .

**Figure 2.** Residual Plot for  $x_1$  and  $x_2$  in Case 1



**Table 6.** Regression statistics

Multiple R	0,999007
R Square	0,998016
Adjusted R Square	0,497024
Standard Error	2,208082
Observations	4

**Table 7.** ANOVA

	df	SS	MS	F	Significance F
Regression	2	4904,469	2452,234	502,9578	0,031514
Residual	2	9,751254	4,875627		
Total	4	4914,22			

Measuring the parameters of the linear model is usually done by using least squares or maximum likelihood.

**Table 8.** Summary output

	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%
Intercept	0	#N/A	#N/A	#N/A	#N/A	#N/A
9,1	-0,4267	1,941208167	0,21	0,84	-8,778	7,92
21,5	1,6621	0,807572452	2,058	0,17	-1,812	5,13

RESIDUAL OUTPUT				PROBABILITY OUTPUT	
Observation	Predicted 34,6	Residuals	Standard Residuals	Percentile	34,6
1	31,93752	2,762478932	1,769289	12,5	34,7
2	35,88389	0,883890449	-0,56611	37,5	35
3	35,74247	0,542471601	-0,34744	62,5	35,2
4	36,32197	1,021971649	-0,65454	87,5	35,3

From calculations, using the linear regression we obtain the following parameters:

ANOVA represents the analysis table of the variance (Table 7). For the variance due to factor  $x$ , Regression, Residual due to the others unregistered factors, and Total due to the all factors:

- Df – degrees freedom:  $k$  – number of explicative variables  $x$  (simple regression  $k=1$ ),  $n-k-1$  for residuals ( $4-1-1=2$  degree freedom) and  $n-1$  for total variance ( $4-1=3$ ); The sum df for Regression and Residual is equal with df / Total:  $k + (n - k - 1) = n - 1$ .
- Coefficients- contain the estimated values of coefficients  $a$  and  $b$ .

$Y = -0.4267 \cdot x_1 + 1.6621 \cdot x_2$  (Table 8).

- Lower 95%, Upper 95% – upper and lower limits of the confidence interval for the parameter. The limits for 0.05 are calculated automatically, regardless of the initialization procedure Regression. It could be said that the linear model parameters are within the following ranges:

$$7.9 < a < 8.77;$$

$$1.81 < b < 5.13.$$

From the formula founded by the computer simulation model results that in Case 1 the two analyzed factors are quite important factors in the evolution of  $y$ . To increase with a monetary unit the  $x_1$  will get an decrease of 0,4267 monetary units of  $y$  and an increase with a monetary unit of  $x_2$  will get an increase of 1,6621 monetary units of  $y$ .

## Case 2

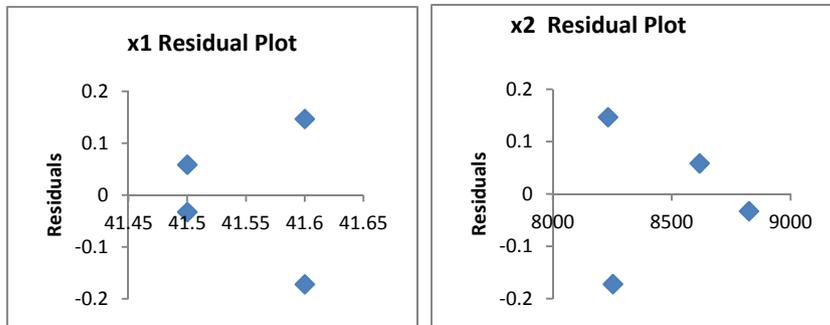
In case 2 we analyze the impact could have two independent variables ( $x_1$ -Hours worked per week of full time employment,  $x_2$ - Employed persons with a second job) on employee career ( $y$ -duration of working life) (Table 9). The PLOT representation show that can be applied a regression function (Figure 3).

**Table 9.** Data regarding the HWW, EPSJ and DWL

Years	Duration of working life (DWL) (y)	Hours worked per week of full time employment (HWW) ( $x_1$ )	Employed persons with a second job (EPSJ) ( $x_2$ )
2010	34,6	41,6	8082,2
2011	34,7	41,6	8252,6
2012	35	41,6	8232,2
2013	35,2	41,5	8616,9
2014	35,3	41,5	8824,8

Source: eurostat.com

**Figure 3. Residual Plot for  $x_1$  and  $x_2$  in Case 2**



**Table 10. Summary output**

Regression Statistics	
Multiple R	0,999994
R Square	0,999989
Adjusted R Square	0,499983
Standard Error	0,166758
Observations	4

Multiple R is the multiple coefficient of correlation between  $X_1$ ,  $X_2$  (from case 2) and  $Y$ . Between the value  $X_1$ ,  $X_2$  and  $y$  there is a direct and strong enough connection due to the amount obtained by Multiple R (0.999994).

R square means that 99.9989% of the variance in the dependent variable  $Y$  is predicted or explained by the independent variables  $X_1$  and  $X_2$  and shows a value which is very close to 1 indicating that the most of the variance in the dependent variables originate in the variation of the regressors, as propagated through the model.

Standard Error shows the average of the values observed deviate from the theoretical values  $y_i$  of the regression line,  $Y_i$  (in this case with  $\pm 0.166758$ ).

Observations are  $n$ , the number of observations,  $n = 4$ .

**Table 11. ANOVA**

	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	2	4914,164	2457,082	88357,72	0,002379
Residual	2	0,055617	0,027808		
Total	4	4914,22			

	<i>Coefficient</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>	<i>Lower 95,0%</i>	<i>Upper 95,0%</i>
Intercept	0	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
41,6	0,655812	0,065457	10,01902	0,009816	0,374174	0,937	0,374	0,937
8082,2	0,00092	0,000321	2,869557	0,103016	-0,00046	0,0022	-0,0004	0,0022

RESIDUAL OUTPUT				PROBABILITY OUTPUT	
<i>Observation</i>	<i>Predicted 34,6</i>	<i>Residuals</i>	<i>Standard Residuals</i>	<i>Percentile</i>	<i>34,6</i>
1	34,87213	-0,17213	-1,45976	12,5	34,7
2	34,85337	0,146634	1,24355	37,5	35
3	35,14161	0,058386	0,495151	62,5	35,2
4	35,33283	-0,03283	-0,27842	87,5	35,3

From calculations, using the linear regression we obtain the following parameters:

ANOVA represents the analysis table of the variance (Table 11). For the variance due to factor  $x$ , Regression, Residual due to the others unregistered factors, and Total due to the all factors:

- $df$  – degrees freedom:  $k$  – number of explicative variables  $x$  (simple regression  $k=1$ ),  $n-k-1$  for residuals ( $4-1-1=2$  degree freedom) and  $n-1$  for total variance ( $4- 1=3$ ); The sum  $df$  for Regression and Residual is equal with  $df$  / Total:  $k + (n - k - 1) = n - 1$ .
- Coefficients- contain the estimated values of coefficients  $a$  and  $b$ .

$$Y = 0.655812 \cdot x_1 + 0.00092 \cdot x_2$$

- Lower 95%, Upper 95% – upper and lower limits of the confidence interval for the parameter. The limits for 0.05 are calculated automatically, regardless of the initialization procedure Regression. It could be said that the linear model parameters are within the following ranges:

$$0.374 < a < 0.937;$$

$$-0.00046 < b < 0,002299.$$

From the formula founded by the computer simulation model results that in Case 2 the two analyzed factors are quite important factors in the evolution of  $y$ . To increase with a monetary unit the  $x_1$  will get an increase of 0,65 monetary units of  $y$  and an increase with a monetary unit of  $x_2$  will get an increase of 0,00092 monetary units of  $y$ .

### Case 3

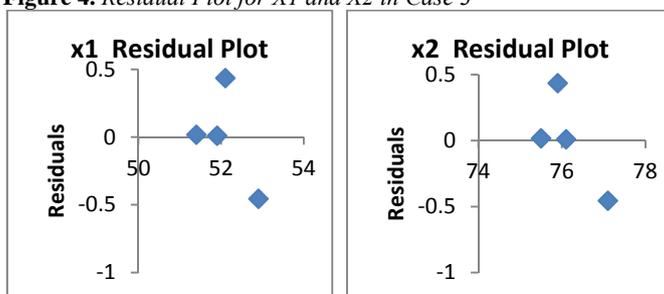
In this case we analyze the impact could have two independent variables ( $x_1$ – Employment rate, by highest level of education attained,  $x_2$  – Employment rates of recent graduates) on employee career ( $y$  – duration of working life).

**Table 12.** Data regarding ERE, ERRG and DWL

Years	Duration of working life (DWL) (y)	Employment rate, by highest level of education attained (ERE) (x1)	Employment rates of recent graduates (ERRG) (x2)
2010	34,6	53,3	77,4
2011	34,7	52,9	77,1
2012	35	52,1	75,9
2013	35,2	51,4	75,5
2014	35,3	51,9	76,1

Source: eurostat.com

**Figure 4.** Residual Plot for  $X_1$  and  $X_2$  in Case 3



**Table 13.** Summary output

Regression Statistics	
Multiple R	0,99996
R Square	0,999919
Adjusted R Square	0,499879
Standard Error	0,445881
Observations	4

Multiple R is the multiple coefficient of correlation between  $X_1$ ,  $X_2$  (from case 2) and  $Y$ . Between the value  $X_1$ ,  $X_2$  and  $y$  there is a direct and strong enough connection due to the amount obtained by Multiple R (0.99996) (Table 13).

R square means that 99.9919% of the variance in the dependent variable  $Y$  is predicted or explained by the independent variables  $X_1$  and  $X_2$  and shows a value which is very close to 1 indicating that the most of the variance in the dependent variables originate in the variation of the regressor factors, as propagated through the model.

Standard Error shows the average of the values observed deviate from the theoretical values  $y_i$  of the regression line,  $Y_i$  (in this case with  $\pm 0.4458$ ).

Observations are  $n$ , the number of observations,  $n = 4$ .

**Table 14.** ANOVA

	Df	SS	MS	F	Significance F
Regression	2	4913,822	2456,911	12358,1	0,006361
Residual	2	0,39762	0,19881		
Total	4	4914,22			

	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%	Lower 95,0%	Upper 95,0%
Intercept	0	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
53,3	-1,88076	1,18282	1,5900	0,2527	6,9700	3,2085	-6,9700	3,2085
77,4	1,746405	0,80889	2,1590	0,1634	1,7339	5,2267	1,7339	5,2267

RESIDUAL OUTPUT				PROBABILITY OUTPUT	
Observation	Predicted 34,6	Residuals	Standard Residuals	Percentile	34,6
1	35,15564	-0,45564	-1,44517	12,5	34,7
2	34,56456	0,435438	1,381091	37,5	35
3	35,18253	0,017468	0,055403	62,5	35,2
4	35,29	0,010005	0,031732	87,5	35,3

From calculations, using the linear regression we obtain the following parameters:

ANOVA represents the analysis table of the variance (Table 14). For the variance due to factor  $x$ , Regression, Residual due to the others unregistered factors, and Total due to the all factors:

- $df$  – degrees freedom:  $k$  – number of explicative variables  $x$  (simple regression  $k = 1$ ),  $n-k-1$  for residuals ( $4-1-1=2$  degree freedom) and  $n-1$  for total variance ( $4-1=3$ ); The sum  $df$  for Regression and Residual is equal with  $df$  / Total:  $k + (n - k - 1) = n - 1$ .
- Coefficients- contain the estimated values of coefficients  $a$  and  $b$ .

$$Y = -1.88 \cdot x_1 + 1.746 \cdot x_2$$

▪ Lower 95%, Upper 95% – upper and lower limits of the confidence interval for the parameter. The limits for 0.05 are calculated automatically, regardless of the initialization procedure Regression. It could be said that the linear model parameters are within the following ranges:

$$3.20 < a < 6.97;$$

$$1.73 < b < 5.22.$$

From the formula founded by the computer simulation model results that in Case 3 the two analyzed factors are quite important factors in the evolution of y. To increase with a monetary unit the x1 will get a decrease of 1.88 monetary units of y and an increase with a monetary unit of x2 will get an increase of 1,746 monetary units of y.

## 5. Proposals

To have an effective development process, the organizations must:

### 1. Build strategies which must consist in:

- integrating individual development plans in the strategic plan of the company;
- strengthening the link between career and HRM systems;
- improving the management career to have greater openness;
- creating the role of manager of career development in organizations;
- developing learning programs in organizations;
- widespread job rotation and job enrichment;
- identifying and develop skills;
- including evaluation programs in career development activities;
- implementing various development careers varied depending workforce;
- making direct link between career and organizational quality initiatives;
- making further study on best practices of career development in a global context.

### 2. Implement an effective career development plan necessary for improvement of:

- feed-back information on scheduling employee training programs, about goals, about the stock of knowledge held about the desired standards, about the various qualities or values may change objectives.
- employer behavior and of employee- following an assessment of the performance, the individual can achieve if necessary a training program or not. In this case, the objectives remain, but may change regarding career management strategy.
- changing working environment that can lead implicitly to change career
- change the strategy management regarding the career- age, family, values, beliefs and experiences can lead to career change strategies.

### 3. Implement simulation techniques in order to:

- optimize processes including career development,
- find the links and the strength between analyzed variables,
- reduce costs and improve performance (individual and organizational),
- improve continuously the present stock of knowledge, skills and experiences.

## Conclusions

Learning is a vital aspect of all human resources development efforts (Werner and DeSimone 2011, p. 67), so the calculations we made in this article show that using simulation and modeling we can improve any activity or process, including the career development. The analysis shows that between the factors which we have analyzed and career development there is a direct, positive and strong relationship, being a reason for analyzing their influence, in order to improve the analyzed process- career development.

Any professional must promote career development among employees or to change their behaviors through learning to face competition, globalization, change and computerization, and the organizations must understand that learning process is made for:

- increasing employees creativity;
- improving innovation;
- increasing the degree of employees responsibility;
- increasing the seniors implication;
- establishing clear principles and rules;
- improving communication, collaboration, and sharing knowledge, experience and skills;
- developing effective systems which must start from top to the employees, implicating all departments and positions;
- developing effective systems based on flexibility, matching each need for development to each employee in order to obtain performance.

Offering effective programs for career development, in organizations appear so called *job challenging*, which highlights the importance of taking into consideration career and job factors in order to understand different facets of individual and organizational life. A focus on these factors enables organizations to develop good practices and effective career programs that in the end will conduct growing the employee performance and achieving competitive advantage.

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