

ÁREA TEMÁTICA: GESTÃO DE PESSOAS E DO CAPITAL INTELECTUAL

# Internal Labour Market as Factor in the Career Success Perceived by an Engineer

*Mercado Interno de Trabalho como Fator de Sucesso na Carreira Percebido pelo Engenheiro*

*Mercado Interno de Trabajo como Factor de Éxito en la Carrera Percibido por Ingeniero*

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## ABSTRACT

The phenomenon of the global crisis in both the financial energy sectors as well as the emergence of new technologies companies consider their success or failure depending on the ability to respond quickly to opportunities in their competitive environment. This competitiveness is found especially in the capacity of their technical professionals. On the other hand career is characterized as protean, boundaryless and directed mainly by the individual. Given this scenario, organizations should organize an internal labor market to attract, develop and retain talent. The purpose of this research is to study the impact of internal labour market and subjective career success perceived by engineers in organizations. For the study a survey was conducted via email to 1135 graduates with a response rate of 89.07%.

Structural equations were then applied to identify relationships. The results show a positive relationship between internal labour market and subjective career success perceived by engineers working in the organization. The conclusions of the study can help engineers and companies to drive the careers of these knowledge workers as a way to help them to be happier and help their companies to have more dynamic and proactive engineers. At the same time, educational institutions with engineering programs will gain a better understanding of an engineer's career, and will be able to use this knowledge to review the effectiveness of their educational programs.

**Key words:** Career success. Subjective career success. Internal labour market and career development for engineers.

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## RESUMO

Pelo fenômeno da crise global nos setores financeiro e de energia, e pelo surgimento de novas tecnologias, as empresas consideram que seu sucesso ou fracasso depende da capacidade de responder rapidamente às oportunidades em seu ambiente competitivo. Esta competitividade é encontrada principalmente na capacidade de seus profissionais técnicos. Por outro lado, a carreira é caracterizada como protéica, sem fronteiras e dirigida principalmente pelo indivíduo. Diante desse cenário, as organizações devem organizar um mercado interno de trabalho para atrair, desenvolver e reter talentos. O objetivo desta pesquisa é estudar a incidência do mercado interno de trabalho e o sucesso profissional subjetivo percebido pelos engenheiros nas organizações. Para o estudo foi realizada uma pesquisa via e-mail para 1.135 graduados com uma taxa de resposta de 89,07%. Equações estruturais foram então aplicadas para identificar relacionamentos. Os resultados mostram uma relação positiva entre o mercado interno de trabalho e sucesso profissional subjetivo percebido por engenheiros que trabalham na organização. As conclusões do estudo podem ajudar os engenheiros e as empresas a dirigir a carreira dos trabalhadores do conhecimento para que alcancem a felicidade e as empresas possam contar com engenheiros dinâmicos e proativos. Ao mesmo tempo, instituições de ensino com programas de engenharia terão melhor compreensão da carreira de engenheiro, e poderão usar esse conhecimento para avaliar a eficácia de seus programas educativos

**Palavras-chave:** Sucesso na carreira. Sucesso subjetivo da carreira. Mercado interno de trabalho e progressão na carreira dos engenheiros.

## RESUMEN

Ante el fenómeno de la crisis global, tanto en el sector financiero como en el energético y la irrupción de tecnologías emergentes, las empresas consideran que su éxito o fracaso depende de la capacidad de responder con agilidad a las oportunidades en su entorno competitivo. Esta

capacidad competitiva radica especialmente en la capacidad de sus profesionales técnicos. Por otro lado, la carrera actual se caracteriza por ser proteica, sin fronteras y dirigida principalmente por el individuo. Ante este panorama las organizaciones deben organizar un mercado interno de trabajo capaz de atraer, desarrollar y retener talentos. Esta investigación tiene el propósito de estudiar la incidencia del mercado laboral interno y el éxito subjetivo de carrera percibido por los ingenieros en esta organización. Para el estudio se aplicó una encuesta, por correo electrónico, a 1135 graduados y el nivel de respuesta fue del 89.07%. Luego se aplicaron ecuaciones estructurales para identificar las relaciones existentes. Los resultados muestran una relación positiva entre el mercado interno de trabajo y el éxito subjetivo de carrera percibido por los ingenieros que trabajan en la organización. Las conclusiones del estudio pueden ayudar a los ingenieros y a las empresas a conducir las carreras de los trabajadores del conocimiento de forma que alcancen la felicidad y las empresas puedan contar con ingenieros más dinámicos y proactivos. Igualmente los institutos de educación con programas de ingeniería pueden entender mejor cómo se desarrolla la carrera de un ingeniero y usar este conocimiento para reexaminar la efectividad de sus programas de formación.

**Palabras clave:** Éxito en la carrera. Éxito subjetivo de la carrera. Mercado interno de trabajo y desarrollo de la carrera de los ingenieros.

## 1 INTRODUCTION

Careers are of great interest to both the individual and the management of an organization. Career development has become a significant component of policy development in many countries, because of its potential impact on the labour market (RICHARD, 2005). The careers of engineers have been the subject of a series of studies that have in common the implicit assumption that the manufacturing of a country is dependent, at least in part, on the quality of

its professional engineers (KEENAN, 1994). However, very promising engineers are being promoted to managerial positions as a way of recognizing their contribution to an organization's goals. But in doing so, the companies lose very knowledgeable professionals and, unfortunately, many of the engineers in question become poor managers (BARUCH, 1999).

Careers have become more open and more diverse, but also less structured and controlled by employers (BARUCH, 2003). Bartlett and Ghoshal (2002) hold that one of today's scarcest and most highly sought-after strategic resources is employee expertise. Being able to build competitive advantages through people and managing the careers of knowledgeable employees—like engineers—is a challenge for departments of Human Resources.

Technological and scientific advances are becoming available more quickly, and the company that misses the window of opportunity for taking advantage of these advances loses the pricing and profit premium available to market leaders. In many companies, science and technology has eclipsed marketing, finance, and even sales as the critical employee segment. These professionals can create the franchise for company growth. Managers of technical employees, like engineer, have a lot to consider as they attempt to limit the turnover of valuable employees. Career opportunities yielded significant predictors of retention than any other type of reward for technical professionals (KOCHANOSKI; LEDFORD, 2001). In the face of global competition for engineering talent, Human Resource Managers need to pay more attention to the internal labour market of the company.

The key role of engineers in company performance has been emphasized in several studies. Engineers, in fact, represent a distinct occupational group: engineering does not quite fit the classic definition of a profession like medicine or law; but there are many elements of professionalism in engineering. Engineers, however, have a stronger need for personal development and growth compared to professionals in other occupations. They need to learn new things,

and to feel challenged. As a result of changes in economic, social, and technological conditions, engineering managers today face more problems in retaining engineers than ever before. This fact, in addition to engineers' orientations and expectations to be treated as professionals, has caused considerable tension and strain in the engineer-management relationship. This calls for changes in engineering management styles to maintain motivation and productivity (BLIGLIARDI; PETRONI; DORMIO, 2005; KEENAN, 1994).

Engineers develop their careers inside the organisations that offer positions in their areas of research and development, logistics, communications, information systems, production, maintenance, and sales, among others. The internal labour market have the potential to become a factor of career success of engineer. This research analyzes the internal labour market as factor of career success perceived by engineers.

The design of the present research was guided by one central question: What is the relationship between technologists' career success and the internal labour market in the organizational?

This cross-sectional survey study employed a questionnaire in order to examine the internal labour markets as factor of career success perceived by engineers. Both objective and subjective perspectives were used, developing empirical evidence for career success of this category of knowledge workers in Latin America.

A better understanding of engineers' career success determinants can help both organizations to be better companies and individuals to achieve their specific goals. Latin American and Western academic journals have contained few papers that discussed career of Latin American engineers

## 2 LITERATURE REVIEW

### 2.1 Career

From a sociological perspective, a career is defined with a structural term as a succession of related jobs, arranged in hierarchy of prestige,

through which persons move in an ordered (more or less predictable) sequence (GARAVAN; COOLAHAN, 1996). In a more psychologically oriented definition, career is the sequence of a person's work-related activities, behaviours, and associated attitudes, values, and aspirations over the span of one's life (ADAMSON, 1997; GARAVAN; COOLAHAN, 1996; HALL, 1986). A career can be viewed fundamentally as a "vehicle" for the continuous realization of self, or more accurately, as a vehicle by means of which an individual may begin to construct a clearer conception of self and self in the world (ADAMSON, 1997).

In this way, the concept of career has a different set of associations when viewed as a sequence of promotions and other upward moves than when it is viewed as a lifelong sequence of jobs or of role-related experiences (HALL, 2002). One widely accepted definition of career is the unfolding sequence of a person's work experiences over time. This definition insists on the relevance of time, rather than adopting a static view of work arrangements (ARTHUR; KHAPOVA; WILDEROM, 2005).

The concept of career changes from the traditional linear model of career as a sequence of hierarchical promotions with a clear uni-dimensional or linear direction of prescribed "advancement" within the organizational hierarchy, to modern, non-traditional models that pay attention to the changing world of career that include alternative career paths as the careers of individuals who may opt-out of corporations in order to start their own businesses (BARUCH, 2004; SULLIVAN et al., 2007).

The most important concepts occurring in studies of the state of today's career realities are:

- a) the "boundaryless" career introduced by Defillipi and Arthur (1994) (short-termism and involves a new form of employability in which the individual, rather than the organization, takes an active rather than passive role in managing his or her career);
- b) the "protean" career presented by Hall (1996), an individual-focused approach,

in which it is claimed that individuals are responsible for their careers and that their unique human resource qualities are based on continuous learning and growth in the pursuit of career goals. The protean model assumes that careers continue to develop throughout life as skills and knowledge are continuously sought in accordance to individual goals;

- c) the "intelligent" career proposed by Defillipi and Arthur (1994), which speaks of the development of three "ways of knowing": knowing-why, knowing-how, and knowing-whom, which are primarily individual assets of motivation, skills, and relationships;
- d) the "post-corporate" career presented by Peiperl and Baruch (1997). On their view, career paths are horizontally rather than vertically evolving links that transcend geographical and organizational boundaries);
- e) the "multidirectional" career by Baruch (2004);
- f) the "customized" career presented by Valcour, Bailyn and Quijada (2007); and
- g) the "kaleidoscope" career model of Mainiero and Sullivan (2005), according to which careers are created on the individual's own terms, and are not defined by the corporation, but by the individual's personal values and life choices. Like a kaleidoscope, individuals' careers are dynamic and in motion. As their lives change, they can alter their career paths to adjust to these changes and need not rely on corporate dictates (HASSAN, 2007; MCDERMID et al., 2001; SULLIVAN et al., 2007).

Also important are the internal and external perspectives presented by Van Maanen and Schein (1975). The external career refers to the more or less objective categories used by members of society to describe the progression of steps through a given occupation. The internal career refers to the set of steps that make up the individual's own concept of his progress within an occupation. Career development is a function of individual and organizational dimensions of career.

According to these two perspectives, careers can also be described in two fundamentally different ways. On the one hand, there are subjective careers, reflecting the individual's own sense of his or her career and the direction in which it is heading. On the other hand, there are objective careers, which reflect the more or less publicly observable positions, situations, and status "that serve as landmarks for gauging a person's movement through the social milieu" (BARLEY, 1989 apud ARTHUR; KHAPOVA; WILDEROM, 2005, p. 179).

It is not only the individual who needs to pay attention to career transitions. Organizations should not merely look at past, static, narrow concepts of careers, but should enlarge the concept to encompass new, more change-oriented careers. This repeated cycle of "out with the old, in with the new" is likely to increase rather than reduce pandemonium. Rather, a more powerful strategy is to incorporate older, more static career concepts along with newer, more dynamic career concepts into a pluralistic strategy for dealing with careers and organizational arrangements. A pluralistic framework will serve as a means for coping with change and the diverse needs of organizations and people, and at the same time as a tool for realigning individuals and organizations (BROUSSEAU et al., 1996).

## 2.2 Subjective career success

Career success is an outcome of a person's career experiences. Career success may be defined as the accomplishment of desirable work-related outcomes at any point in a person's work experiences over time. This encompasses the definition of career provided above. It also encompasses two meanings of success given by the Oxford English Dictionary (1989 apud ARTHUR; KHAPOVA; WILDEROM, 2005): "the attainment of an object according to one's desire," and "the prosperous achievement of something attempted". The first meaning suggests a form of success that is personally (i.e., subjectively) desirable, while the second suggests a form of success—prosperity—

that is likely to rely on (largely objective) social comparisons. These alternative meanings suggest that, as with careers, there are two distinct ways of viewing career success (ARTHUR; KHAPOVA; WILDEROM, 2005).

The concept of career success has followed the evolution of the concept of career from traditional definitions of career success as climbing up the corporate ladder and seeking such extrinsic rewards as salary and bonuses, to more recent definitions of career success, which typically include objective, extrinsic measures as well as subjective assessments, including the individual's attitudes about his or her career. The concept of success changes throughout the work lives of professionals. Young professionals perceive career success especially as an individualistic and multidimensional concept (MCDONALD, 2008; SULLIVAN et al., 2007).

Intrinsic outcomes of career success (i.e., subjective career success) depend on a person's own appraisal of his or her success. Subjective career success refers to a person's own internal perspective on his or her success (POON, 2004). The idea of the protean career, managed by the person not the organization, is strongly advocated by Hall and Moss (1998), the criteria for success here being internal not external (ATKINSON, 2002).

Subjective career success is theoretically more complex. It refers to an employee's evaluations of his or her own career success with reference to self-defined standards, career stage, aspirations, and the opinions of significant others. Subjective career success is a broad, multidimensional construct. It incorporates perceptions of intrinsic success (e.g. work-role, interpersonal success) and extrinsic success (financial, hierarchical success) with respect to achievements, aspirations, and colleagues in the present organizations (NABI, 2001).

## 2.3 Internal labour market

The internal labour market is often used as a process to create an internal mobility in an organisation. The opportunities to cover new posts created in an organisation are in function of specific

qualifications exigency, rules for promotion or employees transfer. The internal labour market is composed of the organisational structure and organisation policies (e. g. rules set and proceedings for promotions, wage fixation, and work assignment). The internal labour market determines mobility and development opportunities and other career characteristics employees may have (GARAVAN; COOLAHAN, 1996).

The internal labour market size is positively related to the opportunities received by the employees for the development of their careers and training. Organisations divide the career into two important parts: firstly, the functions division of jobs in the organisations generate the distribution of opportunities and prizes commonly fixed before hiring personnel; secondly, the organisational proceedings to assign the personnel to jobs affect the distribution of prizes and opportunities in the enterprise and so, influence on the probability to have a career success (PFEFFER; COHEN, 1984).

The academicians (NABI, 1999; PFEFFER; COHEN, 1984) who study the organisations propose that the career success perceived is influenced by the existence of an internal labour market. The career plans are referred to the structured ladder of work progression entering at the low level of the hierarchy and promotion associated to the development of skills and experience.

Nabi (1999) suggests that the presence of a well-structured internal labour market positively influences on the opportunity of a career success in terms of promotion in the hierarchy and improvement of their compensations. These

compensations may be economic or emotional. The lack of possibilities of a career development inside the organisations may be a cause for the high turnover rate of the collaborators.

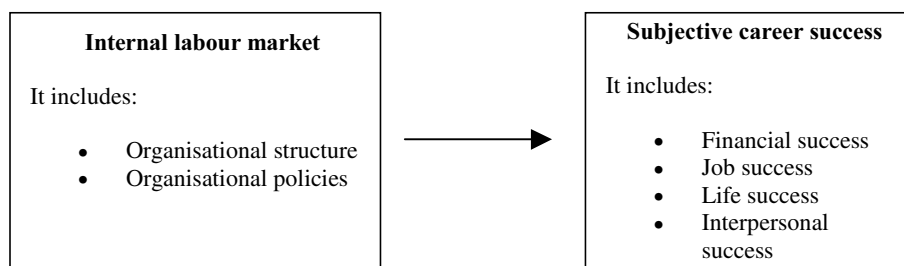
The career development plans performed by the organisations with jobs related to the engineering profession must take into account the great necessity of growing and personal development demanded by engineers compared to other professionals, as well as the great necessity to keep themselves updated and a strong wish of facing challenges. For that reason, engineers are searching jobs that fulfil their necessities (LEE, 2002).

According to this literature, the following conceptual frame is proposed:

### 3 METHODOLOGY

The present research is a cross-sectional and explicative quantitative study. The strategy of inquiry selected was the quantitative approach. It is often employed when the study is oriented to testing theory and understanding the best predictors of outcomes (CRESWELL, 2003; TASHAKKORI; TEDDLIE, 1998).

The specific method of data collection in this cross-sectional study was a questionnaire with statistical analysis, with the intent of generalizing from a sample to a population that does not require control of behavioural events and focuses on contemporary events (YIN, 2003). Aiming to obtain 1000 answers, a stratified sample was defined with 1135 graduates of Peruvian



**Figure 1** – Relation between the internal labour market and the subjective career success.

Source: Own elaboration based on Arthur, Khapova, Wilderom (2005); Pfeffer, Cohen (1984); Daft, Lewin (2008); Garavan, Coolahan (1996); Lee (2002) and Nabi (1999).

technological institution. From the relation of the total population of 3407 graduates sorted by years of experience (arranged in a descending order from bigger than minor professional experience) and with jump of 3, 1135 graduates were selected. After the piloting (pre-testing) phase, the final survey was sent on January 2, 2008, and the total number of answers received as of February 29, 2008 was 1011. The response rate was 89.07%, extremely high. In this study, the unit of analysis considered is the individual graduated from an engineering technology program.

### 3.1 Survey design

The development of instruments for all dimensions in this study was carried out in three stages according the procedure proposed by Boon-Itt and Paul (2006). First, in the design stage, scales for each variable used in previous research were selected through a literature review. The initial set of scales was translated into Spanish with a special attention to question phrasing in order to create a reliable instrument and with this purpose it was pre-tested with graduates and practitioners in order to provide confirmatory reliability.

The second stage includes survey development through a pilot test using a small sample of the target population for assessing the validity and reliability of the translated survey. In this stage, each item was tested in relation to how it works with each construct. Finally, in the third stage, survey evaluation was developed with the final version of the survey and it was applied to the final sample. The validity and reliability assessment measures were probed again. The survey was designed with special attention to the relevance of the research questions and the goal of the study (BAILEY, 1994; SCHWARTZ, 1978).

### 3.2 Measurement

The operationalization in this study was made according the following criteria: the experience of the researcher, variables which the

researcher believe he can measures, the focus of the study, costs and time.

#### 3.2.1 Subjective career success

This was assessed with the five-point scale used by Gattiker and Coe (1986) to define four factors of perception of career success: (1) Job Success (Initially with 18 items and  $\alpha = 0.94$  in the pilot phase and finally with 16 items and  $\alpha = 0.93$ ), which reflects individual perceptions about job satisfaction; (2) Life Success (Initially with 8 items and  $\alpha = 0.81$  in pilot phase and finally with 4 items and  $\alpha = 0.81$ ), which reflects individual perceptions about satisfaction with life overall; (3) Financial Success (Initially with 6 items and  $\alpha = 0.86$  in pilot phase and finally with 3 items and  $\alpha = 0.86$ ), which reflects individual perceptions of compensation, and (4) Interpersonal Success (Initially with 6 items and  $\alpha = 0.72$  in the pilot phase and finally with 4 items and  $\alpha = 0.69$ ), which reflects individual perceptions about satisfaction about the relationship with peers.

The table 1 shows the main components and item-total scale analysis used to measure the subjective career success. The respondents were requested to check a box from (1) "Agree completely" to (5) "Disagree completely" to indicate their level of agreement with such statements as "I am receiving positive feedback about my performance from all peers" (job success); "I am happy with my private life" (life success); "I am receiving fair compensation compared to my peers" (financial success); "I am often asked for advice on private matters by my peers" (interpersonal success).

#### 3.2.2 Internal labor market

After a detailed review of literature the questionnaire of Nabi (2001) was selected due the use of items measuring internal labour market both in dimension of structure and practices. Respondents were required to assess the extent to which each item described their organizations career related practices on a five point scale

**Table 1** – Main components and item-total scale analysis used to measure the subjective career success.

Item	Rotated component matrix(a)				Item – Total Statistics		Reliability statistics
	Component						Cronbach's Alpha
	1	2	3	4	Corrected Item – Total Correlation	Cronbach's Alpha if Item Deleted	
P1	0.523735520				0.500545429	0.931487640	0.932204299
P2	0.582336808				0.543710880	0.930606804	
P3	0.679028469				0.657810660	0.927936507	
P4	0.639269309				0.597345727	0.929415030	
P5	0.759829219				0.726995661	0.926069678	
P6	0.687037665				0.661839233	0.927844220	
P7	0.712382938				0.664785525	0.927756433	
P8	0.719433022				0.699190778	0.926857413	
P9	0.726928727				0.664177348	0.927779551	
P10	0.754782638				0.699378923	0.926836868	
P11	0.719055380				0.645577744	0.928248258	
P12	0.768059595				0.699620013	0.926831262	
P13	0.751522230				0.685655789	0.927213508	
P14	0.808661842				0.742994744	0.925616265	
P15	0.596517092				0.554880779	0.930370034	
P16	0.735287870				0.704447032	0.926698455	
P17			0.741494082		0.586756783	0.779998977	0.809721702
P18			0.684087409		0.701980292	0.723890456	
P19			0.667208252		0.692097051	0.729346814	
P20			0.729894252		0.55312387	0.796859165	
P21		0.56838586			0.681274845	0.871363866	0.886383935
P22		0.57776991			0.653096832	0.874184388	
P23		0.74000203			0.791090025	0.851025693	
P24		0.71578435			0.701781323	0.866779220	
P25		0.75124896			0.737581857	0.861077559	
P26		0.67958686			0.651533734	0.874337308	
P27				0.542578384	0.383950637	0.672234405	0.685829673
P28				0.758831893	0.549902911	0.580571917	
P29				0.709657268	0.554298603	0.560780911	
P30				0.541007384	0.412363732	0.656438639	
	Rotation converged in 6 iterations.						

(completely disagree = 1 to completely agree = 5). The original instrument was tested and after the semantic adaptation of redaction of each items a contextual and reviewed version were used in this study for measuring organizational activities, reward distribution, career progression practices as the perception of a well structured career ladder.

The method of the principal components was applied to check the validity of the scale of Internal Labour Market which composed by 4 items and not applied to the independent variables. This method was used in our study to verify the validity of the scale, if the items are organized under the definition of the construct



**Table 2** – Analysis of the main components and item-total scale used for the structure of the internal labour market.

Component Matrix(a)				
Component	Item – Total Statistics			
1	Item	Corrected Item – Total Correlation	Cronbach's Alpha if Item Deleted	Cronbach's Alpha
0.85116989	There is a clearly defined structure	0.738838192	0.887005123	0.90141954
0.90158303	There is a related career progression	0.815511917	0.859258528	
0.87121393	Work levels at the entrance	0.768105086	0.876736886	
0.88920647	There is an internal work structure	0.795758895	0.866670271	
1 component extracted.				

to be measured. In order that a correct application of factorial analysis, two basic conditions were considered: parsimony (defined with the lowest number of possible items) and interpretability (factor needs capacity of substantive interpretation). The table 2 shows the results of the main components and item-total scale analysis performed to measure the internal labour market in an organisation.

A descriptive statistics and inferential statistics was obtained with the SPSS 15.0. Among the three approaches usually associated with SEM (strictly confirmatory, alternative models, and model development), this study uses the confirmatory approach; in this way, the model generated by theory was tested using SEM procedures to determine if the pattern of data was consistent with the theoretical model.

A further advantage of examining variables within an SEM framework is the ease with which problems in the data, such as abnormal or missing data, can be handled using special and/or robust estimators that can be implemented in most SEM packages. Depending on the software package, estimation methods have been developed recently that are capable of addressing both abnormal and missing data (BRYAN; SCHMIEGE; BROADDUS, 2007). This study uses AMOS, the SPSS version of SEM.

#### 4 RESULTS

Although the theoretical condition of the normal distribution assumption is still not present in the study, the influence of non-normal data is reduced when using an SEM with a larger sample size. A sample size is considered large when the ratio between the sample size and the number of observed variables is not less than 15 (STEVENS, 1996). In this study the sample is considered to be large since the ratio is  $> 15$ , more than the recommended threshold (CAO; MOKHTARIAN; HANDY, 2007).

Hu, Bentler and Kano (1992) analyzed the performance of estimation procedures with different sample sizes and violations of the hypotheses of normality. These authors recommend the method of generalized least squares (GLS) under considerations of less rigorous multivariate normality as the case of this study. The GLS was used to improve the estimation of parameter (KUAN, [2004]) and to compute parameter estimates, correctness of fit tests, and standard errors.

The results of our analysis support the hypothesis that internal labor market is positively related to career success perceived by an engineer with a highly significant relationship ( $\beta = 0.63$  and  $p < 0.001$ ).

The next step was to assess the overall model and check to see if the model fits the empirical data. Overall fit of SEM models can be determined by a multitude of fit indexes, each with its associated advantages and disadvantages. Hu and Bentler provide an overview of available indexes, as well as guidelines for assessing the acceptable range for each index (BRYAN; SCHMIEGE; BROADDUS, 2007).

Initially CMIN/DF was used. CMIN/DF is the minimum sample discrepancy divided by degrees of freedom. This is called the relative chi-square or normal chi-square. Some researchers allow values as large as 5 for adequate fits, but more conservative researchers reject models with a relative chi-square greater than 2 or 3 (GARSON, c1998).

Given the fact that chi-square statistics and the CMIN/DF (chi-square divided by the degrees of freedom) are affected by sample size, and are very unlikely to meet accepted levels, the Goodness of Fit Index (GFI), the Adjusted Goodness of Fit Index (AGFI), and the Parsimonious Goodness of Fit Index (PGFI) were also used to assess the model's fit. The figure 2 shows the pattern with the resulting values of the structural equations application.

GFI is the Goodness of Fit Index. GFI varies from 0 to 1. By convention, GFI should be equal to or greater than 0.90 if the model is to be accepted. AGFI is the Adjusted Goodness of Fit Index. AGFI is a variant of GFI and varies from 0 to 1. AGFI should also be at least 0.90. PGFI should be equal to or greater than 0.05.

To evaluate the data adjustment of the data pattern, four index of adjustment measurement was obtained from AMOS:

- a) CMIN/DF (Chi Square Minimum Sample Discrepancy): according to the most conservative researchers it must be between 2 to 3 to show a good adjustment although values near 5 (GARSON, c1998) are accepted;
- b) GFI (Goodness of Fit Index);
- c) AGFI (Adjusted Goodness of Fit Index), and;
- d) RMSEA (Root Mean Square Error of Approximation). GFI and AGFI indexes

must be over 0.90 as it is recommended; RMSEA must be under 0.06.

The table 3 shows the obtained values.

**Table 3** – Adjustment summary of the used pattern. CMIN/DF, GFI, AGFI and RMSEA are adjustment indexes.

Adjustment measurement	Value
CMIN/DF	3.338
GFI	0.899
AGFI	0.884
RMSEA	0.048

## 5 DISCUSSION AND CONCLUSIONS

This study reveals characteristics on career development of Peruvian engineers with orientation to the practice and further insight into the career success perceived by engineer was sought. Overall, an internal labor market was found as very important factor of career success perceived in careers of engineers . The results support the hypothesized relationship between organizational structure and career success with empirical data. The organizational labor market allocates labor, determines wages, and defines the scope of specific jobs according to sets of rules and procedures (O'MAHONY; BECHKY, 2006).

The need to improve the measurement of subjective career success has been demonstrated in several studies (ARTHUR; KHAPOVA; WILDEROM, 2005, GUNZ; HESLIN, 2005; HESLIN, 2005). In the present study, the questionnaire has self-referent items (evaluation of career success relative to personal standards and preferences) as well as other-referring items (evaluation of career success relative to the outcomes achieved by other people). Items related to job success explain a significant amount of total variance in subjective career success and SEM shows high value of beta (0.94) between job success and subjective career success. One possible explanation of this finding has to do with the Latin American context, in which jobs are people's

foremost concern. In Peru 60% of the population is unemployed or underemployed and some of the first effects of the financial world crisis is a strong reduction of the growth of the employment.

The importance and prominence of organizational career planning and management as part of Human Resources management has been recognized by many scholars (BARUCH, 2003; HALL, 1986; HASSAN, 2007; VAN MAANEN; SCHEIN, 1975). The positive

relationships found among internal labor market with career success perceived is consistent with these past researches. Part of the explanation may be the fact that careers of engineers mostly take place within an organization. In this study, the percentage of engineers employed as dependent worker was 94%, as against only 6% independent workers.

Moving into higher positions in the career of engineers is associated with positions as senior

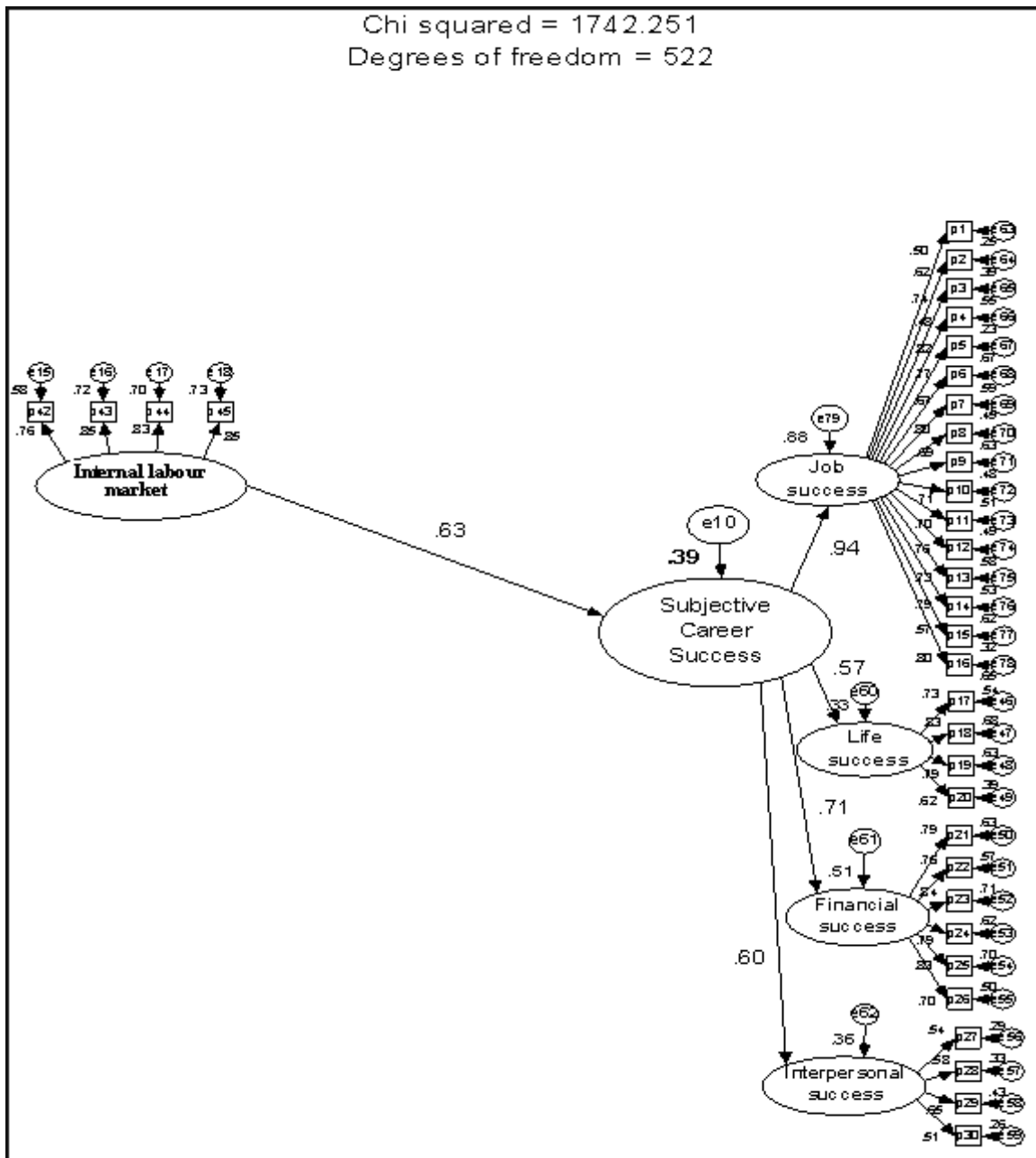


Figure 2 – Structural Equations Pattern.

engineer or, at least, expert coordinator. These positions need a specific set of skills for effective performance and career success (MAINIERO, 1986). Engineers are very active in continuous education activities and they have the expectations of promotions in the internal labor market.

Organizations can use the results of this study to design internal labor markets, internal career structures, and specific programs aimed at enhancing the career success of employees. Despite the fact that the literature on career has focused on the individual, it is necessary for the organization to have an effective management of the careers of their knowledge workers, so as not to lose this competitive value. Strategic human resource scholars have argued that companies can effectively influence the interactions, behaviors, and motivation of employees through different human resource practices (COLLINS; SMITH, 2006).

Organizations must attend to the proportion of the technical staff that prefers to remain in full contact with technical problem solving, for which management has no attraction. The traditional technical ladder of promotion then becomes a consolation prize, and very often de-motivates an otherwise productive member of the technical staff (MAINIERO, 1986; PETRONI, 2000).

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