

# **Relationship between job performance and job satisfaction viewed from the chaos theory perspective**

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**Abstract:** During the last twenty years, a new way to understand complex systems has emerged in the field of social sciences. This approach is often called nonlinear dynamics, dynamic systems theory or chaos theory. This process is referred to as self-organization, and is thought to be responsible for change and continuity in organizational systems. Principles of self-organizing dynamic systems have recently been applied to psychology, especially in explaining cognitive development. This paper addresses core issues in industrial organizational psychology, such as the dynamic relationship between job performance and job satisfaction in organizational complex context.

**Keywords:** job performance; job satisfaction; curvilinear relationship; chaos theory; inverted U theory

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## **1. Review of job satisfaction – job performance relationship**

Along with the meta-analysis study developed by Judge, Bono, Thoresen and Patton in 2001, the concept job performance has been qualitatively extended. The purpose of the study undertaken by Judge and collaborators was to identify comprehensive networking patterns of the job performance and job satisfaction concept.

Studying specialty literature, most research in the field of industrial and organizational psychology reached opposite results and conclusions contrary regarding the relationship between job performance and job satisfaction. Judge and collaborators have proposed seven relational models assuming the existence of a causal relationship, interdependence or lack of correlation between the two analyzed concepts: performance and job satisfaction.

Due to the limits of previous meta-analyzes conducted by Brayfiels and Crockett (1955) and Iaffaldano and Muchinsky (1985) and misinterpretation of results, Judge and collaborators (2001), have analyzed 312 studies,  $N = 54.417$ . The average correlation coefficient between job satisfaction and job performance was estimated at 0.30. The 7 emerged models on the relationship between job satisfaction and performance are shown in Figure 1.

According to the authors, the first model assumes a causal effect of job satisfaction on work performance. This model is considered outdated, supporting the hypothesis that increased morale leads to increased productivity (Strauss, 1987).

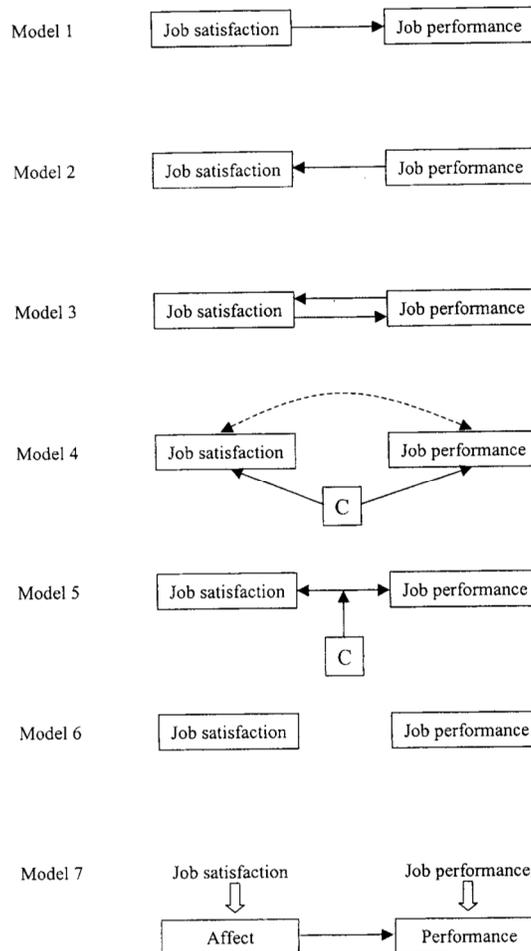
Shore and Martin (1989) found that performing regression analysis on job performance having as predictors job satisfaction and organizational commitment, satisfaction showed more incremental

variance over professional performance (professionals  $\Delta R^2 = 0,07$ ,  $p < 0,05$  and clerical workers  $\Delta R^2 = 0,06$ ,  $p < 0,05$ ) than organizational commitment ( $\Delta R^2 = 0,01$  for both categories).

Based on expectations theory, Model 2 assumes that job satisfaction is the result of rewards associated to professional performance (Vroom, 1964 Lawer and Porter, 1967). Researchers whose results fall within this model argue that job performance has a significant causal effect on job satisfaction.

Model 3 includes the results according to which satisfaction and professional performance are in a reciprocal relationship without scientific foundation. Dynamic model is necessary to firmly ground this model. One of the most interesting dynamic interrelated explanations offered for such modeling is given by Schwab and Cummings (1970), in their attempt to adapt arch and Simon's (1958) model to the satisfaction-performance relationship.

**Figure 1.** Models of relationship between job satisfaction and job performance elaborated by Judge, Bono, Thoresen and Patton (2001). (Note that in Models 4 and 5, C denoted a third variable)



Model 4 combines studies concluding that between satisfaction and professional performance there are false correlation. Cohen and Cohen (1983) have defined as a false correlation an observed correlation between two variables due to both correlating with a third immeasurable variable.

Pierce, Gardner, Cummings and Dunham (1989, 1993) have shown that self-esteem correlated with job satisfaction and performance. Keller (1997) showed that when statistically controlling involvement and organizational commitment, the relationship between satisfaction and performance becomes insignificant.

Model 5 brings together studies that support the existence of moderators between job satisfaction and performance. The most investigated moderator was reward contingency. Numerous studies have assumed that job satisfaction affects job performance to the extent that employees are rewarded based on performance. Spector (1997) has showed that between salary and job satisfaction there is a weak relationship. In addition to financial reward, other moderators were investigated: self-esteem, cognitive ability, need of achievement, career level, performance pressure, time pressure, occupational group, dyadic duration, similarity in problem solving styles, affective disposition and situational constraints.

Model 6 implies the absence of a relationship between performance and job satisfaction. Most studies included in this model deal with performance and satisfaction as distinct variables that do not interact with each other.

Model 7 gathers the studies that assume rethinking the concepts of job satisfaction and work performance. Staw, Sutton and Pelled (1994) have analyzed the relationship between emotions rather than satisfaction and performance. Results indicate that positive emotions are related to employee motivation. Studies conducted by Staw and collaborators have demonstrated that positive emotions relate to job performance.

The authors concluded that the meta-analysis study of the relationship between job satisfaction and professional performance must not be abandoned, authors indicating directions for future research including possible mediators and moderators factors.

In 2004, encouraged by the results of this meta-analysis, Schleicher, Watt and Greguras have reviewed the concepts, noting that among the 17 moderators suggested by Judge (2001) there are not found any moderators involving job satisfaction as an attitude. The authors add in the moderator's model regarding the relationship between job performance and job satisfaction the affective-cognitive consistency moderator (ACC). It is noted that job satisfaction is a stable orientation, a disposition (Arvey, Bouchard, Segal and Abraham, 1989, Davis-Blake and Pfeffer, 1989; Newton and Keenan, 1991, Staw, Bell, and Clausen, 1986; Staw and Ross, 1985). However, not everyone is consistent over time in attitudes regarding job satisfaction (Steel and Rentsch, 1997).

Performance represents a core concept in organizational psychology, although in research regarding selection strategies, practitioners look at performance as to a stable trait. Acknowledging performance as a dynamic system over time helps to facilitate our understanding of job performance and its antecedents (Hofmann, Jacobs, and Gerras, 1992; Sonnentag and Frese, 2012).

Developing a comprehensive theory of performance involves studying areas such as learning, forgetting, engagement and burnout by exploring various temporal processes which lead to positive and negative cycles of performance. Predictors of change have been researched in areas such as job design (Wall and Clegg, 1981), reinforcement (Luthans, Paul and Baker, 1981), training and education (Lipsey and Wilson, 1993) and self regulatory processes bring about performance change and adaptation (Bell and Kozlowski, 2008). More recent studies have focused on how people adapt over time to workplace or task changes (Lang and Bliese, 2009; LePine, 2003). An important aspect is represented by the fact that performance dynamism is not limited to individual performance but occurs at team and organizational level.

For a better understanding of job performance, organizational psychologists have to make predictions about performance trajectories over a period of time. In developing performance concepts, researchers must identify individual characteristics and situations that can help predict performance changes. Deadrick, Bennet and Russel (1997) have examined predictors of individual performance trajectories and identified job experience and abilities as predictors of performance, with workers with previous experience improving more slowly than workers with no previous experience. Cognitive ability predicted a fast increase in performance. There has also been research examining motivational constructs such as personality traits in the context of more sophisticated models of individual performance change. (Steele-Johnson, Osburn, & Pieper, 2000)

In a more recent research, Thoresen, Bliese, Bradley and Thoresen (2004) have distinguished between maintenance and transitional job stages using the Big Five personality variables. Researchers have demonstrated that job tenure and conscientiousness were significantly related to mean levels of performance and extraversion was a marginally significant predictor of performance with respect to performance increase and acceleration over time during the maintenance stage. In the transitional stages agreeableness and openness to experience were related to performance. Thus, personality factors as predictors of performance trajectories differ between maintenance and transitional job stages.

Another key finding in the field of organizational psychology is that cognitive ability and conscientiousness, two important predictors of performance are more fluid and change over life span (Baltes, Staudinger & Lindenberger, 1999). Decreasing cognitive ability does not translate into lower levels of performance, although lower levels of absenteeism, reduced tardiness and citizenship behavior are all positively affected with age.

In search of explaining why the relationship between predictors and performance changes over time, there have emerged two models on dynamic performance: the changing tasks model and the changing subject's model.

The changing subjects model theorizes that individuals who possess various characteristics such as abilities, motivation and job knowledge, result in performance levels which change even if the contribution of these characteristics to performance remains constant (Keil & Cortina, 2001).

In the changing tasks model performance changes are attributed to job changes, new job roles such as supervisory, or revised organizational requirements, predicting that an individual's performance changes because the determinants of performance change (Alvares & Hulin, 1972; Deadrick & Madigan, 1990; Fleishman & Hempel, 1954). This model implies that changes in job requirements – promotion, raise, supervisory attributions, the introduction of new technology, or other change in job duties – may lead to the need for new sets of abilities while reducing the impact of current abilities on job performance.

Thus, estimating performance vectors will require the combination of theory, empirical research, individual-specific information and organization-specific information. All human resource decisions that involve predicting performance (recruiting and selection, promotion, reward, retention, training) are based on the information seeking to understanding performance as a dynamic system. On the other hand, human resource actions can be assessed based on their predicted effects over job performance (future impact of implementing a new recruiting and selection system, an innovative payroll system based on different criteria, a new training program). Answers to such questions bother practitioners in human resource management of large organizations, who are striving to come up with a comprehensive talent management strategy that implies retaining the most performing employees.

Estimating performance vectors will require the combination of theory, empirical research, individual-specific information, and company-specific information, in establishing expected patterns.

Performance trends over time result in outcomes that are highly relevant for both organizations and individuals. From an individual's perspective performance trends may look at their development and may decide whether to leave the organization, since performance levels may impact job satisfaction. A supervisor observes performance trajectories of their team and determines whether they should remain in their current job position or whether changes to the job role or team dynamics is required in order to ensure optimal levels of job performance.

## **2. Linear versus nonlinear systems in organizational psychology**

Organizational and industrial psychologists have focused on linear explanations, where the output of a system is proportional to its inputs. This type of relationship assumes a simple system, whose processes can be measured and understood, but most systems in nature are nonlinear, outputs in this case are not proportional to inputs. A small input to a complex system can produce a small, moderate or even large effect. The processing taking place in these systems is intricate and difficult to explain.

In the classical view, parts of a system are in many cases assumed to be independent. Independence assumes that a part of the system is compartmentalized, insulated from the rest of the system to which it belongs. The cognitive science postulation of separate modules in the brain that are dedicated to processing specific information is an example of independence. The outcome can always be predicted, regardless of the overall state of the system.

The dynamical systems view can account for complex interactions between modules, because it sees the parts of a system as interdependent. In this case, a part of the system's performance is dependent on the state of the entire system; how it operates in one state is different from how it might operate when the system is in another state, thus the system is analytically understood.

Researchers in organizational and industrial psychology that examine the behavior of the different pieces of a system and then put these separate descriptions together to explain the behavior of the whole are acting in a manner of reductionist approach. When systems resist reductionist explanations and cannot be broken down into pieces, they function in a holistic manner. Every piece relies on the parts around it to function properly as described by the gestalt psychologists, "the whole is greater than the sum of its parts". Emergence is a property of these kinds of holistic systems.

Instead, the dynamical systems approach sees the systems as open that cannot be considered independent of its surroundings. The employee is part of an organization that is in turn part of the world and treating them as an open system means taking into account "external" factors such as social and personal factors, thus employees influence organizations and organizations influence employees.

The independence traditional approach has a linear view of causality, where variables affect others in a sequential manner. The best way to visualize this is as a chain of arrows where variable A affects B, which then affects variable C. The dynamical systems approach is that variables can have all sorts of causal relations that act concurrently, as the result of feedback, where a variable's output at one point in time can alter the future activity of both itself and many other related variables.

Thus, dynamical systems takes a long-term view of system action, since feedback can alter not just what happens in the immediate moment following a cause, but over the entire future course of

the system's behavior. Feedback mechanisms can promote the maintenance of homeostasis, but they more often produce increases, decreases, oscillations, fluctuations, and other sorts of dynamic processes that change with time. So while the traditional view sees short term immediate effects, the dynamical systems view sees long-term dynamical effects (Friedenberg, J. and Liby, B., 2009).

The classical view in all sciences was that the world is operating according to deterministic rules and if we know these laws/rules and we have sufficient information as to the state of a system, then we can predict with accuracy how the system will behave in a long-term perspective and most of all we can control the system.

Dynamical systems theory also acknowledges that there are deterministic rules that govern a system's behavior, but these knowledge of starting conditions are not sufficient to allow complete long-term prediction. Even if we have exhaustive knowledge of a system's starting state and we are able to predict its future behavior, over time though, the behavior will diverge from our prediction no matter how accurate our starting observations are. Thus, dynamical systems allow only for partial understanding and control.

If the traditional systems would not allowed sudden changes, only gradually and slowly over long periods of time, the dynamical systems perspective allows for such sudden and rapid change, when system's arrival at a critical point. This critical point is represented by the conditions under which a system surpasses a complete and decisive change. As we will further see in the result of our research, the relationship between job performance and job satisfaction cannot steadily, continuously and linearly behave over time. There comes a critical point from which one will increase and simultaneously the other will decrease and vice versa. This apparently chaotic behavior can be explained in the same manner as water becomes steam as it reaches 100 C. If an employee keeps improving job's performance over time, job satisfaction may not keep increasing or can be negatively affected, due to some other interference factors such as attractors, as we will further see.

Thus, shortly defined a dynamic system represents a system of elements that change over time. All dynamic systems share several properties in common, such as:

1. **Self-organization.** New forms emerge spontaneously from the complex interactions among lower-order system elements, thus, the state of a system is neither pre-determined, nor is it the product of external causes.
2. **Hierarchical organization of nested structure.** Lower-order elements self organize to form the structure at the next higher level and consequently these structures represent the elements for the next higher level. This structure is nested within smaller or longer time scales.
3. **Reciprocal and circular cause.** Within a level, interactions among system elements are reciprocally causal, X and Y cause each other. Across levels, causation is circular; the lower-order elements create the macro structure, as well as the macro structure constrains interactions among lower-order elements, in the same manner as the emergence of personality structures, discrete emotional experiences in various contexts becoming the elements from which personality emerges.
4. **Non-linear dynamics.** A system's behavior is governed by positive and negative feedback processes responsible for both stability and change. Negative feedback processes are self-stabilizing, the elements continue to be linked in a similar way over time and thus the stability of the system is maintained. Positive feedback amplifies small variations in the lower-order interactions to create system instability, particular stage that is necessary to break down old patterns and emerge

new forms in their place. The dynamics of a system are the result of the interference of both positive and negative feedback processes.

5. **Perturbation.** A particular system can be analyzed throughout the response pattern following a perturbation. A system may appear stable, but can rapidly become unstable following a relatively small perturbation. On the other hand, a system that first appears equally stable may be relatively impervious to perturbation and thus confirm its stability.
6. **The process of a phase transition.** When change occurs, a phase transition represents a period of instability and high variability. Due to phase transition, one stable pattern or structure breaks down and a new structure emerges in its place.

Thus, the individual employee cannot be isolated from work environment, nor can the constituent elements be neglected.

At a specific time, chaotic systems can reach what is called a bifurcation, where they can switch to one of two alternate states. The bifurcation is a sizeable qualitative change in behavior. The study of rapid change is called catastrophe theory, and it states that a particular combination of conditions, such as temperature and the degree to which steel is flexed, can give rise to dramatic alterations such as the collapse of a bridge. Catastrophe theory describes how small, continuous changes in control parameters (i.e., independent variables that influence the state of a system) can have sudden, discontinuous effects on dependent variables. Such discontinuous, jump-like changes are called phase-transitions or catastrophes.

In psychology, catastrophe theory has been applied to multi-stable perception (Stewart & Peregoy, 1983), transitions between Piagetian stages of child development (van der Maas & Molenaar, 1992), the perception of apparent motion (Ploeger, van der Maas, & Hartelman, 2002), sudden transitions in attitudes (van der Maas, Kolstein, & van der Pligt, 2003), and motor learning (Newell, Liu, & Mayer-Kress, 2001; Wimmers, Savelsbergh, van der Kamp, & Hartelman, 1998).

Several authors have described the process of family therapy from the perspective of chaos theory. Hudgens (1998) and Chamberlain (1995) use chaos theory as a model for the dynamics of dysfunctional families, viewing the “attractor” in terms of what draws the family together and then looking at the therapist as a “strange attractor” who can pull the individual family members and the entire family towards new patterns of communication and interaction.

Referring to research in organizational psychology, there has been evidence that employee well-being is a dynamic process that undergoes continuous changes. As employees go through positive and negative experiences, they are continuously shifting from positive to negative states of consciousness (Beal and Ghandour, 2011; Heller, Watson and Ilies, 2006). When employee well-being is studied longitudinally over short periods of time, it shows continuous fluctuations and changes across time (Ilies, Dimotakis and De Pater, 2010; Sonnentag and Ilies, 2011; Xanthopoulos, Bakker, Demerouti and Schaufeli, 2009). Several researchers have found that employee flourishing tends to behave in a nonlinear way (Ceja and Navarro, 2009, 2011; Guastello, Johnson and Rieke, 1999; Losada and Heaphy, 2004).

Traditionally organizational researchers are embracing a nonlinear dynamical systems approach, which considers nonlinearity and discontinuous change, to study employee happiness and well-being (Ceja and Navarro, 2009, 2011; Guastello, 2002; Karanika-Murray and Cox, 2010).

Although there has been found evidence that employee well-being presents continuous changes over time, there is still a need to model these fluctuating dynamics. Catastrophe theory (Thom, 1975) can offer an accurate approximation for understanding these dynamical changes (Ceja and Navarro, 2011). Catastrophe theory has provided successful approximations for other organizational processes, such as work motivation (Guastello, 1987), employee turnover (Sheridan, 1985; Sheridan

and Abelson, 1983), decision making (Wright, 1983), personnel selection (Guastello, 1982), organizational change (Bigelow, 1982), and competitive dynamics (Kauffman and Oliva, 1994). However, it is difficult to test such models directly in work environments.

While there is evidence that work-related flow is highly dynamic and presents nonlinear changes, most research on flow in the workplace has been based on traditional between-variance models (Bakker, 2005; Demerouti, 2006; Eisenberger, Jones, Stinglhamber, Shanock and Randall, 2005; Salanova, Bakker and Llorens, 2006) and techniques based on linear model (Fullagar and Kelloway, 2009; Makikangas, Bakker, Aunola, Demerouti, 2010).

As we have seen, non-linearity allows for the occurrence of radical phenomena, such as sudden phase shifts as a function of continuous changes in independent variables, deterministic but unpredictable chaotic behavior and self-organization or improbable spontaneous coherent behavior.

### **3. Explaining the relationship between job performance and job satisfaction – a chaos theory perspective**

Chaos theory is the “science of patterns, not predictability” (Chamberlain, 1995). At the technical level, chaos theory involves the application of non-linear dynamic mathematical systems theory and multidimensional fractal geometry to continuous and irregular data sets (Mandelbrot, 1977). Chaos theory is the study of complex, and nonlinear systems. It is used to study turbulent events and nonlinear equations (Lent, 1996).

As we have seen, chaos theory has three defining characteristics: (1) chaotic systems are deterministic, (2) chaotic systems are sensitive to initial conditions, and (3) chaotic systems appear random and disorderly but they actually have a sense of order and pattern.

Occupation is defined as a subset of work responsibilities and duties that can be performed in any one of a number of locations or organizational settings. Job is a circumscribed unit of work tasks established by an employer. An individual engages in a contract with an employer to perform tasks entailed in a job. Individuals may contract with multiple employers to perform the work of several jobs in parallel or overlapping time frames.

Career is the total accumulation of jobs that one performs throughout the span of a lifetime. This has been described as “time expended working out a purposeful life pattern through work undertaken by the individual” (Reardon, 2000).

Career path is the linear sequential linkage of jobs that one performs throughout the life span. A career path, considered a path-dependent phenomenon (Hayes, Blaine and Meyers, 1995; Peterson, Krumboltz and Garmon 2003), is characterized by three dimensions, the time to progress through a series of jobs, the direction taken at each step, and the magnitude of responses to differing levels and types of turbulence (internal and/or external).

Career development is the continued acquisition of knowledge, interests, cognitive and psychomotor skills, values, beliefs, and talents that undergird the on-going acquisition and maintenance of jobs along a career path (Garmon, 2004). The goal of a career is to maintain satisfying, productive, and continuous employment within a changing and uncertain work environment. Career development does not take place in isolation from other facets of life; therefore, an aim of a career is to contribute to a satisfying and meaningful life (Garmon, 2004).

Career path satisfaction is the individual’s subjective measure of the success of his or her career path in meeting the goal of contributing to a satisfying and meaningful life. Career path satisfaction differs from job satisfaction in that it is a holistic retrospective measure of the satisfaction of overall jobs over the life span.

Regarding our current research, we will present the two scales job satisfaction (JSS) and job performance utilized.

One of the most widely used definitions of job satisfaction in organizational research is that of Locke (1976), who sees job satisfaction as a pleasurable or positive emotional state resulting from the appraisal of one's job or job experiences (Locke, 1976). As Spector's research (1997) revealed, job satisfaction is assessed at both the global level (whether or not the individual is satisfied with the job overall), or at the facet level (whether or not the individual is satisfied with different aspects of the job). Spector (1997) lists 14 common facets: Appreciation, Communication, Coworkers, Fringe benefits, Job conditions, Nature of the work, Organization, Personal growth, Policies and procedures, Promotion opportunities, Recognition, Security, and Supervision.

Job Satisfaction Survey (JSS) was developed by Paul Spector (JSS, Spector, 1985). Blau (1999) found a reliability coefficient alpha of 0.89, in a longitudinal study. Spector (1997) found positive correlations between all 9 subscales. JSS is freely available for research purposes (Spector, 1994). JSS consists of 36 items describing nine subscales (4 items on each subscale). General job satisfaction score shall be calculated by summing all 36 responses. Thus, the score for each of the nine sub-scales from varies from 4 to 24, and the total score, the sum of the 36 item, ranges from 36 to 216. Items are declarative and are evaluated on a 1 to 6 scale, where 1 means total disapproval and 6 strongly agree with the statement. Some items are positively polarized, others negatively. Items positively polarized graded from 1-6, 1 being strongly disagree and negative items are quoted inversely polarized (one becomes 6, and so on). The items negative polarized are: 2, 4, 6, 8, 10, 12, 14, 16, 18, 19, 21, 23, 24, 26, 29, 31, 32, 34, 36.

Testing for reliability, we have found a Cronbach Alpha coefficient of 0,78, which indicates a good internal consistency of the scale (N=51)

Job performance regards the appreciated performance on a 1 to 5 scale (where 1 stands for - does not meet standards and 5 for - exceeds standards) for the following aspects: 1) job specific knowledge, 2) quality/quantity of work, 3) communications, 4) interpersonal skills, 5) organization, planning and process thinking, 6) judgment and decision making, 7) customer satisfaction, 8) teamwork, 9) adaptability to change, 10) management of human resources (not required for non-supervisory associates) and 11) performance against objectives (optional – attach performance objectives).

For example, *Specific knowledge work context related* was defined as the ability to understand, use and demonstrate technical concepts effectively, meet operating procedures and legal requirements in all aspects; keeping abreast of current developments and trends in area of expertise. Assessors (direct hierarchical supervisor) have ranked this performance criterion by using behavioral anchored scales:

1. *Regularly make mistakes because of wrong knowledge on certain standards in complex aspects of the job; shows few signs of improvement, despite previous advice.*

2. *Holds technical information and/or operating on some standard issues (may be defective occasionally, leading to poor performance) may not be versed in all aspects of the complex processes. Would not normally expect other people to go to this person for technical or operational information because these knowledge gaps. This person should go to others for information rather than perform inadequately due to gaps.*

3. *General knowledge about all aspects of owning and operating the technical standard of their own job. Would be expected occasionally to double check procedures with others on the most complex tasks.*

4. *Holds general knowledge of technical and operating procedures for all aspects of their own job and those who are in close contact with it. If you need a person to know both the standard and*

*alternative procedures for carrying out any aspect of this job, you can think of that person as a source.*

*5. Display specific knowledge and innovative capacity of technical concepts and operating procedures for even the most complex tasks. Most people in the department consider this person an expert on a variety of specific jobs department.*

Archival data from 51 current employees who completed tests as part of the employment selection process are included in this study. Data was gathered for job applicants being hired between 18.05.2010 and 16.09.2013. These archival data were collected in March 2014. The archival data include demographic information and organizational data. Of the participants, 56.9% are male. Regarding the hiring year 5.9% became employees in 2010, 19.6% became employees in 2011, 33% became employees in 2012 and 41.2 % became employees in 2013. Employees are aged between 25 and 39. The range of incomes varies from 1.800 Ron (Young graduate) to 37.957 Ron (Production Manager).

Testing for normal distribution of data, for job satisfaction and job performance variables the Kolmogorov-Smirnov coefficient is significant at a p value  $p > 0,05$ , which indicates normal distribution.

Testing for multicollinearity, we have found tolerance of over 0,20 and VIF under 4, results that indicate that in this model, multicollinearity does not represent a problem.

The main purpose of this study is to highlight the relationship between job performance and job satisfaction inside an industrial multinational company from Arad (51 technical and administrative staff). The present study takes the position that job performance – job satisfaction relationship is a dynamic one, and none of the Judge's models can explain it, unless it is regarded from non-linear perspective.

These considerations lead to **Hypothesis: *Between job performance and job satisfaction there is a dynamic relationship.***

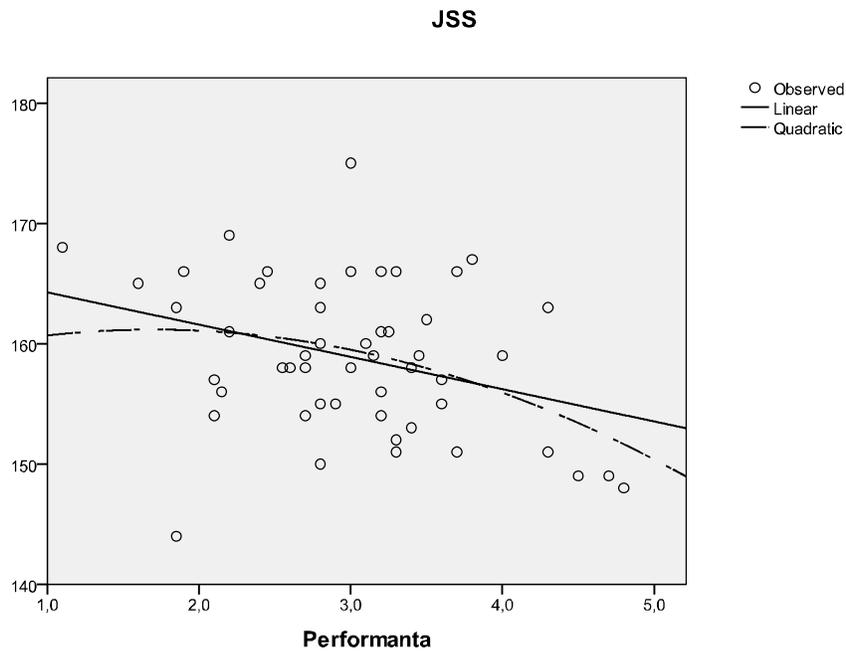
Running the Pearson correlation analysis (N=51), results indicate a negative correlation between job satisfaction (M=158,84; SD=6,373) and job performance (M=3,02; SD=0,786),  $r = - 0,331$ , at a  $p < 0,05$ . Although this negative correlation coefficient is consistent with other researcher's results (Clark & Oswald, 1996; Sloane & Williams 2000; Green & Tsitsianis 2005), we cannot integrate these finding in any of Judge's models, more than that, we cannot distinguish causality between them.

Given the dynamic system present in any organizational complex context, this negative correlation means that with increased performance, decreases job satisfaction of employees and vice versa. In our organizational context, where all processes are based on employee's skills and reflect themselves in the degree of demonstrating these skills in the current job, surely there is a tremendous pressure on employees. An excessive workload is harmful over job satisfaction and also health as outlined by Clark (1997) and Golden & Wiens-Tuers (2006).

In the purpose of a deeper understanding of this negative correlation, we will further assume that between the two variables there is not a linear relationship, but a dynamic, curvilinear bond between job satisfaction and job performance, meaning that poor job performance and equally excellent job performance are associated with decreased job satisfaction, while average performance at work is associated with a higher degree of job satisfaction.

We are presenting in Figure 2 a scatter plot having as independent variable job performance (performanta) and dependent variable job satisfaction (JSS); the curvilinear relationship between the two variables is shown.

**Figure 2.** The curvilinear relationship between job satisfaction (JSS) and job performance (performanta)



Coefficients associated with this relationship are listed in Table 1, noting the materiality of ANOVA analysis coefficients and the estimator parameters that are significant at a  $p < 0,04$ .

**Table 1.** Model Summary and Parameter Estimates for job performance and job satisfaction

**Model Summary**

R	R Square	Adjusted R Square	Std. Error of the Estimate
,357	,128	,091	6,075

The independent variable is Job performance.

**ANOVA**

	Sum of Squares	df	Mean Square	F	Sig.
Regression	259,415	2	129,708	3,515	<b>,038</b>
Residual	1771,330	48	36,903		
Total	2030,745	50			

The independent variable is Job performance.

### Model Summary and Parameter Estimates

Dependent Variable: JSS

Equation	Model Summary					Parameter Estimates		
	R Square	F	df1	df2	Sig.	Constant	b1	b2
Linear	,110	6,027	1	49	<b>,018</b>	166,941	-2,682	
Quadratic	,128	3,515	2	48	<b>,038</b>	158,302	3,372	-,991

The independent variable is Job performance.

Thus, hypothesis is confirmed by the results indicating a dynamic curvilinear relationship in the shape of an inverted U, with the effect that both low and high levels of performance are associated with a lower job satisfaction in work and medium performance is associated with higher levels of job satisfaction, as conceptualized from the perspective of Spector (1994).

Cumulative results obtained in this study upon job satisfaction are somewhat contradictory in terms of meta-analyzes presented. We have initially identified a high level of satisfaction per sample, reporting the mean average ( $m = 158.84$ ,  $SD = 6,373$ , minimum 144 maximum of 175) to the JSS standard formulated by Spector; scores included in the range 144-216 belonging to employee characterized by job satisfaction. Then we have found a significant negative correlation between job satisfaction and job performance, and finally we have demonstrated a curvilinear relationship between the two variables.

Although taken separately, the two variables are characterized by a linear trend over time while analyzing them together we see that the system no longer behaves linearly. Our suggestion in this case would be reviewing the significance of the relationship between job satisfaction and professional performance in future studies analyzing this relationship from a dynamic perspective, not just static.

Thus, systems considered to be chaotic aren't really chaotic at all – they are just not as predictable as the cause-effect associated with linear dynamics. In nonlinear systems output is not proportional to input – a little bit of input can produce an enormous change in output – or not. In linear systems change can be predicted by what has happened in the past. In nonlinear systems, change is discontinuous, with sudden unpredictable jumps and sudden transitions resulting from dramatic reorganization (McClure, 1998).

#### 4. Conclusions

The focus of chaos theory is on the process in which simple systems give rise to very complicated unpredictable behavior, on the other hand complexity theory focuses on how systems consisting of many elements can lead to well-organized and predictable behavior. Self-organization implies that new levels of form, organization and complexity often arise out of the interchanges between organisms and their contexts.

When a complex, nonlinear system becomes stressed or “perturbed”, the system becomes unstable; the further the system gets from equilibrium the more unstable it becomes. Human beings as well as organizations experience such a phenomenon as anxiety, fear and stress. The system may make changes to reestablish equilibrium, but these changes will be first-order changes – linear, gradual, segmental, predictable, moderate and incremental.

The inverted U theory is rooted in the drive theory stipulated by Hull (1951). This drive theory states that drive represent a directed, motivated or energized behavior that an individual has towards

achieving a certain goal. The main component is performer's level of competencies. Drive theory is focused on the relationship between arousal and performance, seeing it as linear, in other words performance increases in proportion to arousal. Thus, high arousal level results in high performance level, due to the fact that competency is well-learned; if the targeted competency is not well-learned, performance will decrease as arousal increases.

This theory helps explain why beginner employees find it difficult to perform well under pressure. Often entry-level employee's work associated competencies level decreases if they are competing with senior employees using new competencies. This theory also explains how experienced employees perform much better under stress using acquired work competencies. Thus, the impact of arousal on performance is much more complex. An approach in investigating arousal is represented by the inverted U theory developed by Yerkes and Dodson (1908). The inverted U theory states that an increase in arousal causes high performance up to an optimal point, also called moderate arousal level; after this point, high levels of arousal would trigger poor performance. This inverted U theory theoretically explains the dynamic relationship between performance and satisfaction, meaning that, at a certain point, job satisfaction reaches a moderate level, after that starting decreasing.

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The main purpose for statistics is to predict a patterned variable's future behavior. On the opposite side, chaos theory aims predicting non-patterned variables' future behavior in an unlimited possibilities context. Both approaches use probabilities coefficients computed in different shapes. Chaos theory states that all variables even those that seem to have chaotic trajectories can be predicted based to a dedicated function. From this point to understanding employee's personality and predicting future organizational behavior is just a little step.

### **Author Contributions**

In this paper, we report on a model that tested the dynamic relationship hypothesis between job satisfaction and job performance in an organizational research. Our hypothesis is confirmed by the results indicating a dynamic curvilinear relationship in the shape of an inverted U, with the effect that both low and high levels of performance are associated with a lower job satisfaction in work and medium performance is associated with higher levels of job satisfaction, as conceptualized from the perspective of Spector (1994). This is significant because these findings continue Judge, Bono, Thoresen and Patton's meta-analysis on the relationship between job satisfaction and job performance (2001). The paper should be of interest to readers in the areas of complex systems and nonlinear dynamics in Organizational Psychology and Human Resources Management.

### **Conflicts of Interest**

"The authors declare no conflict of interest".

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