VALIDATION OF A CONSTRUCT TO IDENTIFY THE IMPACT OF AUTONOMY LEVELS, LEADERSHIP STYLES AND CONSCIOUSNESS LEVELS IN WORK TEAM'S PERFORMANCE ON THE SHOP FLOOR

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ABSTRACT

Studies about work teams have been developed over time, growing in recent years. As we know, there are variables that can impact an organization's teams and their performance. Cordeiro has been developing a study over the years that correlates leadership, autonomy and consciousness levels. Therefore, this research has the objective of developing and validating a construct to identify the impact of leadership profiles, team's autonomy levels and team members' consciousness levels on teams' performance. To achieve this goal, two questionnaires were formulated (one for leadership and one for autonomy), using Google Forms to build it. The leadership questionnaire was based on Goleman's studies, while the autonomy questionnaire was based on Bastos and Cordeiro recent studies. The Sphinx software was used to validate the questionnaires, aiming to verify a Cronbach Alpha higher than 0,6, which makes it possible to validate the construct. With a 0,72 Cronbach's Alpha for leadership and 0,92 for autonomy, the main goal of this research was achieved, validating the construct. The next step for further research is to verify in practical terms the three variables correlation on the shop floor of industries located in metropolitan region of Curitiba – PR, using the construct as a tool for a quantitative research.

Keywords: Team Work; Consciousness Levels; Leadership; Autonomy; Cronbach Alpha.

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INTRODUCTION

Teamwork has been treated as a source of competitiveness in manufacturing operations since 20th century, presented as a potential Fordist-Taylorist paradigm substitute (MARX, 2010). After an unsuccessful start, teamwork gained strength with the advent of sociotechnical principles propagated by Tavistock Institute researchers in London (MARX, 2010; FLEURY & FLEURY, 1997). Authors such as Emery and Trist (1965) initiated a sort of a group work rescue in the 1960's, as something justifiable from the both the social and technical points of views.

Womack and Jones (1992), Liker (2005) and other authors characterize the sociotechnical and Japanese approach to the organization production as a break with the Fordist-Taylorist paradigm, eliminating the separation between thinking and doing, typical of Fordist-Taylorist approach. In this context, work teams are seen as the organizational structure type capable of involving workers in activities besides the routine, contributing to problem solving and process innovation on the shop floor (BESSANT, 2003; MARX, 2010).

Approaches based on Wilber's (2000) Integral Theory, like Beck and Cowan (1996) and Cordeiro et al. (2010) proposed a complement to the sociotechnical approach, including workers' consciousness level as a variable to be adjusted to the technical elements in job design on the shop floor (BASTOS & CORDEIRO, 2016).

Based on the idea that operational workers can and should solve problems, Cordeiro et al. (2010) and Muniz Junior et al. (2012) identified critical success factor for knowledge management (KM) effectiveness on the shop floor. Recently, approaches based on Wilber's (2000) Integral Theory, such as Beck and Cowan's (1996) and Cordeiro et al.'s (2010) include workers' consciousness level or individual values as a sociocultural variable to be considered during the Organizational Design of Improvement Programs on the shop floor. Many works were found on the relationship between teams' autonomy levels and leadership variables, such as the ones of Trevelyan (2001) and Rosenfield (2003). However, studies using three variables to assess organizational performance are still scarce.

Bastos and Cordeiro (2016) conducted systematic literature review that found a gap in the literature regarding the crossed impact of teams' autonomy levels, leadership style and consciousness levels on team's performance. Based on these result, Bastos and Cordeiro (2017) developed and validated, by a specialists' panel, a model that correlates the three variables and teams' effectiveness.

This research is continuation of a Bastos and Cordeiro (2017) project and seeks to develop and validate a construct based on the model proposed by the authors, correlating team's autonomy levels, leadership profiles and team members' consciousness levels to teams' performances. It's a descriptive research focused on the elaboration and validation of a set of questionnaires to be used later in a quantitative survey. The questionnaires were formulated on Google Forms tool and imported to Sphinx software, to obtain the Cronbach Alpha reliability coefficient that will enable the construct validation. This work begins with this introduction, which is followed by the theoretical framework, the methods section, the results and their analysis and finally, the study conclusion.

1 THEORETICAL FRAMEWORK

1.1 TEAMWORK ON THE SHOP FLOOR

Teamwork has emerged in recent years as an important way in which work can be organized (WATERSON et al., 1997). Work teams can be defined in many ways, nevertheless, all of them synthesize that a work team is a group of two or more individuals, which exists to solve tasks, have common goals, interacts socially and is embedded in an organizational context (KOZLOWSKI & BELL, 2003).

Pruijt (2003) believes that the concept of teamworking is the result of two different developments: the neo-Tayloristic form of organization, and the anti-Tayloristic ways of organizing work. Frederick Winslow Taylor (1856 – 1915), an American engineer, was the first person to propose scientific methods in administration theories (at the first half of 20th century), based on a higher productivity, standardization of instruments, and study of the time and the movements of workers, emphasizing the individual contributions of each worker to the organization (WOOD JR, 1992). Throughout the years, specifically after the end of World War II, the sociotechnical approach began to be applied on some important researches, most of them led by Eric Trist, seeking improvements in the English mining sector. The main idea was that the teamworking became the central point rather than the individual, developing workers' abilities and knowledge (MARX, 1994). According to Motta and Vasconcelos (2006), the ideas of sociotechnical theory were based on approaching the work as something more than simple routine and individual tasks, in which work teams would have to adjust and organize their work, interacting with each other, and eventually increasing workers' commitment. In the 1950's, according to Wood Jr. (1992), the Japanese engineer Eiji

Toyoda went to the USA to get to know the American automobile industry (which used Ford concepts) and was impressed by the size of the factories and their standardized processes. Returning to Japan, Toyoda proposed a new form of work organization, adapting the Fordism to Japanese culture and to Japan's specific economic context of the time (after World War II), leading to the Toyota Production System. The teamwork used by Toyota was based on grouping workers into teams, under the orientation of a leader. In the Toyotism, the workers have multiple functions in the production line, being multifunctional employees. (WOOD JR, 1992).

Some similarities can be found between Toyotism and neo-Tayloristic form of organization. Both systems have one permanent leader, who is responsible for supervising and working on the line with the other employees (PRUIJT, 2003). Similarly, anti-Tayloristic and Semi-Autonomous groups share common characteristics. The main ones are that there are less strict rules, more flexibility, no supervisor within the team and all team members participate in decisions, being Volvo a good example of it (PRUIJT, 2003).

1.2 TYPES OF TEAMS: AUTONOMY LEVELS

Companies have increasingly adopted group work since the 1990's in order to adapt to a new scenario, characterized by quick changes in the business environment (SIMONETTI, MARX, 2010).

Marx (1998) developed a model, called "Framework of Dimensions and Depth of Autonomy", which divides the dimensions of autonomy into three groups: Production management, HR management, and Planning management. For each one, Marx assigned a score from 0 to 10, which allowed to establish correlations and also classifying work teams as Enriched or Semiautonomous groups.

What differentiates the two groups is the type and level of autonomy granted to each one. Marx (1998) puts that Enriched groups follow the Japanese model of administration, and are related to flexibility, greater responsibility and expansion on the field of workers' activity, equivalent to neo-tayloristic forms of organization proposed by Pruijt (2003). In contrast, Semiautonomous groups have full responsibility for the production, and the members have the autonomy to define the division of tasks and work methods, equivalent to anti-Tayloristic forms of organization proposed by Pruijt. Basically, enriched and Semi-Autonomous groups differ by the autonomy degree, being the first one focused on operational improvements, and the second one, focused on the achievement goals and competitiveness (MARX, 1998).

Another possible classification of types of teamwork regarding autonomy, is suggested by Devaro (2008), who classifies the work teams as Autonomous, which the team members have the freedom to jointly decide how their work should be done, and Non-Autonomous, which team members don't have the freedom to give their opinion, and are told not only what to do, but how to do it.

Wzoreck and Cordeiro (2015) conducted a research within three companies in the auto parts industry in the state of Paraná, exploring both enriched and semi-autonomous groups in a more deeply fashion, and found that autonomy depends on formation, training, maturity and motivation.

According to Luca and Tarricone (2002, p. 641) "team members must be flexible enough to adapt to cooperative working environments where goals are achieved through collaboration and social interdependence rather than individualized." So, the successful teamwork relies upon synergism existing between all team members, creating a propitious environment, with commitment, interdependence, open communication and positive feedback.

1.3 LEADERSHIP STYLES

Leadership is the ability to inspire and influence people, in which the leader seeks the voluntary participation of your group to achieve organization common goals (NANUS, 2000). Therefore, a leader is a person who delegates, lead and guide a group of people on their activities, having some characteristics like knowledge, respect, enthusiasm, charism and competence (KELLEY, 1999).

Nowadays, companies are concerned with employee's motivation and satisfaction, in order to reach better results, commitment and profits. In these definitions, to be well-succeed, leaders have to deal with communication, interpersonal relationships, teamwork, besides the challenge to guide and motivate their subordinates, so that they can have success on their tasks (HUNTER, 2006).

One of the most popular categorization of leadership styles is proposed by Lewin, White and Lippitt (1939), which divides them into three types: i) *authoritarian or autocratic, ii) democratic* and iii) *laissez-faire.*

Autocratic Style of Leadership is characterized by leaders who decide the guidelines, measures and techniques without consulting any employee (KHAN et al., 2015). According to Minicucci (1995), this leadership style is seen in military leaders (very strict and inflexible). The employee's behavior tends to show tension, frustration and aggressiveness, with low spontaneity, initiative and friendship. However, Lück (2002) explains that this leadership style can be suitable for insecure workers, who

do not have autonomy and are not used to take decisions, being necessary in some situations to achieve goals.

Democratic Style of Leadership focuses on the leader and his subordinates, where the strategic guidelines are debated by the team, with the manager encouraging the employees to be a part of the decision making (ALCALDE et al., 2013). The democratic leader is objective, supervising the group and leaving the task divisions for them. According to Khan et al. (2015), this style can produce high quality and quantity of work for long periods of time, due to the good environment created between leader and subordinates.

The Laissez-faire Leadership Style, also known as "hands-off" style, is based on provide little or no direction and gives employees as much freedom as possible (KHAN et al., 2015). The leader does not have much control or responsibilities, and the production ends up not being satisfactory, since much time is wasted in discussions and personal issues (FACHADA, 2003).

Lewin et al.'s (1939) conducted an experiment which pointed out the democratic style as the most effective one. According to them, Autocratic style could lead to revolution, and with a Laissez-faire approach, the employee's freedom affected team performance. Nevertheless, it's important to mention that this conclusion was obtained in a very specific context and shouldn't lead to generalizations.

Daniel Goleman, an internationally known psychologist, in his article "Leadership that Gets Results" (2000), proposed six different styles of leaders, according to the emotional intelligence competencies he developed (self-awareness, self-regulation, motivation, empathy and social skills). The leadership styles are divided in: *coercive, authoritative, affiliative, democratic, pacesetting* and *coaching.* Instead of trying to identify a better style, he pointed out that the more styles a leader has mastered, the better for its teams' results. Goleman's styles are presented in Exhibit 1.

EXHIBIT 1 – Goleman's Leadership Styles

continue

STYLE	OPERATING WAY	STYLE IN A SENTENCE	EMOTIONAL COMPETENCE	WHEN MUST BE USED ?	IMPACT ON THE COMPANY CLIMATE
COERCIVE	Demands immediate compliance	"Do as I say"	Directed toward goals, self-control	In crisis	Negative
AUTHORITATIVE	Mobilize people toward a vision	"Let's go together"	Self-confident, empathy	To change business visions/ directions	Positive

EXHIBIT 1 – Goleman's Leadership Styles conclusion

STYLE	OPERATING WAY	STYLE IN A SENTENCE	EMOTIONAL COMPETENCE	WHEN MUST BE USED ?	IMPACT ON THE COMPANY CLIMATE
AFFILIATIVE	Creates harmony	"People first"	Relationship, communication	To motivate teams, solve problems	Positive
DEMOCRATIC	Builds consensus through participation	"What do you think?"	Collaboration, leadership, communication	To create consensus	Positive
PACESSETING	Guide the team to achieve company's goals	"Do what I do, now!"	Consciously targeted, initiative	To get quick results	Negative
COACHING	Develop people for the future	"Try this"	Development, empathy, self-awareness	To improve performance, develop people	Positive

Source: Adapted from Goleman (2000).

According to Goleman (2000) the most effective executives use a collection of distinct leadership styles – each in the right measure, at just the right time.

> An alternative approach, and one I would recommend more, is for leaders to expand their own style repertories. To do so, leaders must first understand which emotional intelligence competencies underlie the leadership styles they are lacking. They can then work assiduously to increase their quotient of them. (GOLEMAN, 2000, p.90)

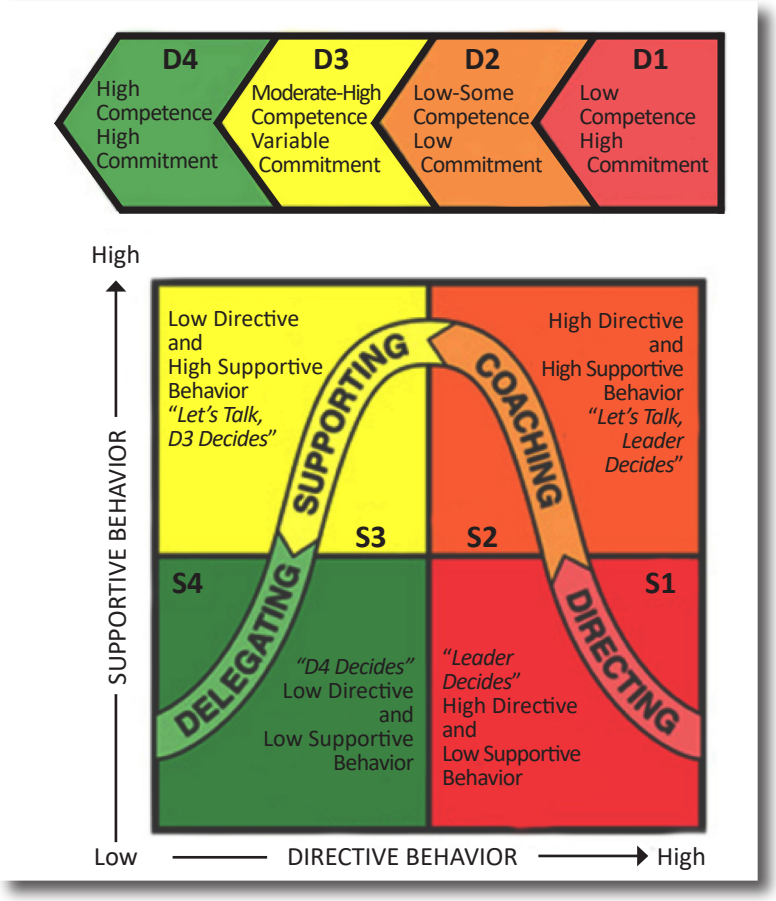
The Situational Leadership, proposed by Hersey and Blanchard (2007), provide an interrelationship between the leader and the employees, in which the leader must adjust his style to fit in the employee's needs, with reference to the skills, readiness and progress level of team members. This approach is considered important, for the reason that the focus is not only in one kind of worker's behavior, but on a variety of them.

The leadership styles of situational leadership include (see figure 1):

- Style 1 (S1) "Directing" characterized by "high task and low relationship" behaviors;
- Style 2 (S2) "Coaching" characterized by "high task and high relationship" behaviors;
- Style 3 (S3) "Participating" characterized by "high relationship and low task" behaviors.

- Style 4 (S4) “Delegating” characterized by “low relationship and low task” behavior (HERSEY, 2007; BLANCHARD, 2007).

Figure 1 - Situational Leadership Style



Source: HERSEY and BLANCHARD (2007).

Chen and Silverthorn (2005) developed a research in the US industry with 126 managers, approaching the situational leadership. They concluded that leaders with more adaptability presented more willing employees to realize the tasks, less intention to change jobs, more satisfaction and less stress.

The most important aspect regarding leadership is that the leader must have knowledge, information and conviction on what he or she is doing. Therefore, the leadership is necessary in all kind of organizations, to inspire and gather people for a common purpose, so that the company can grow (CHIAVENATO, 2005).

1.4 CONSCIOUSNESS LEVELS

According to Trompenaars (1994), organizational culture is the way through which groups of people solve problems, being that each organization has its own culture, with different approaches, values and worldviews. Like organizations, employees also have different opinions, behavior and actions, being the manager's responsibility to use the best approach to achieve the company's objectives. Even so, due to organizational variables, some of these approaches may or may not work. Therefore, the author suggests four dimensions to analyze culture's organization:

1. Family (power-driven culture): culture is focused on power, with an affectionate leader, who decides what the best actions;
2. Eiffel Tower (function-oriented culture): focused on function, has a strong hierarchy inside the organization;
3. Guided Missile (project-oriented culture): focused on the project, is characterized by being egalitarian, doing what is necessary to perform the tasks;
4. Incubator (satisfaction-oriented culture): focused on satisfaction, aims the personal fulfillment.

According to Trompenaars (1994):

> […] these business cultures types are "ideal". In practice, the types are mixed or superimposed by a dominant culture. However, this separation is useful to explore the basis of each type in terms of how employees learn, change, solve conflicts, reward, motivate, etc. (TROMPENAARS, 1994, p.144)

In his book "Riding the Waves of Culture", Trompenaars (1998) highlights that many applications of management theory have turned out badly, even in experienced international companies. The reason for this would be that each country/region has its own culture. A pay-for-performance could work better in countries like US, Netherlands and UK, but in more communitarian cultures, like Germany and France, it may not be so successful. Therefore, "the managers must operate on a number of different premises at any one time. These premises arise from their culture of origin, the culture in which they are working and the culture of the organization which employs them. [...] The internalization of business life requires more knowledge of cultural patterns." (TROMPENAARS, 1998, p.3).

Clare Graves developed during the 1950's and 1960's a model focused on depicting human evolution and information systems (GRAVES, 1970). In 1952, he began to work on something that he called "Theory of Levels of Human Existence", by trying to explain

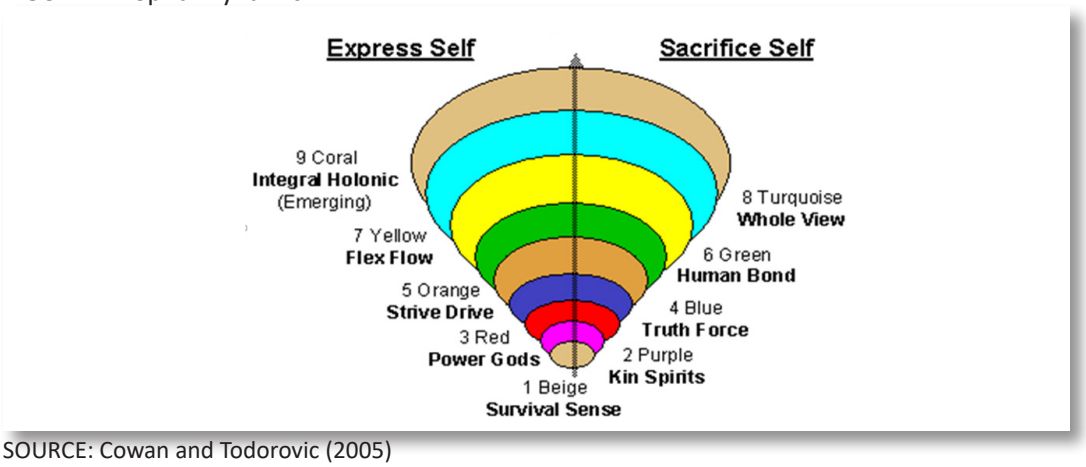
why people's reaction and motivation are so varied. The research results along the years, allowed him to classify psychosocial development in two helices – helix 1 identifying 'life conditions' and helix 2 denoting 'awakened capacities in the mind' – respectively represented by the A-H and N-U alphabet letters (BUTTERS, 2015). According to Graves (1970), each level is linked to a psychosocial system, resulting from the "life condition" and "human neuropsychological system"/ "brain capacities" interaction. The same way that happens with individuals, these previously lived social stages remains inside a country or a society culture, until a new stage come and changes the environment.

Later, Graves's work was significantly amplified by Don Beck and Christopher Cowan, who proposed the Spiral Dynamic Theory, using colors to differentiate human consciousness levels, with each level having a specific color, and a spiral to demonstrate the human consciousness evolution (VISSER, 2017). This new application was very important to solve serious sociocultural problems, making Beck and Cowan active participants of discussions that culminated in the end of Apartheid in South Africa, showing that Spiral Dynamic principles can reorganize businesses, revitalize communities, reform systems and reduce environmental internal tensions (WILBER, 2000).

Spiral Dynamics describes biopsychosocial systems in form of an expanding spiral. The term biopsychosocial reflects Dr. Graves' insistence on a multidisciplinary approach to understanding human nature (COWAN; TODOROVIC, 2005):

- Bio: for the neurology and chemical energy of life;
- Psycho: for the variables of personality and life experiences;
- Social: for the collective energy in group dynamics and culture as the interpersonal domain influences human behavior;
- System: for the interdependence and action/reaction of these three upon one another in a coherent whole.

FIGURE 2 – Spiral Dynamic



SOURCE: Cowan and Todorovic (2005)

The researchers divided the colors in two groups: warm colors (beige, red, orange and yellow), which are associated to individual, and cool colors (purple, blue, green and turquoise), which are related to communities (COWAN, TODOROVIC, 2005).

According to Beck and Cowan (1996), the first six levels are grouped in subsistence level called "First-tier", in which an individual believes that his/her vision of the reality is the correct one. From there, according to the authors, there is a consciousness revolution, emerging the other two last levels, called "Second-tier", when human consciousness understands all spiral components. The Exhibit 2 shows a synthesis of Spiral Dynamic proposed by Beck and Cowan, using the Graves's bases work.

EXHIBIT 2 – Consciousness Levels

CONSCIOUSNESS LEVELS	THOUGHT	BASIC MOTIVES	INDIVIDUALS EXPRESSION
Beige (A-N)	Instinctive	water, food, survival	Survival Instinct: stay alive.
Purple (B-O)	Animist	superstitions, rituals, tribes	Ancestral Spirits: search security
Red (C-P)	Egocentric	impulsiveness, action	Power Gods: imposes power over others
Blue (D-Q)	Absolutist	meaning, rules, morality	Truth Force: authority's obedience. Insert the order and ensures the future
Orange (E-R)	Strategic	consumerism, entrepreunership	Impulse for Achviment: analyze and creates strategies for your prosperity
Green (F-S)	Consensual/ Pluralist	community, iguality, sharing	Human Bond: people's well-being is the priority
Yellow (G-T)	Ecological	principles, knowledge	Flexibility: flexible adaptation to changes
Turquoise (H-U)	Holistic	collective individualism	Global Vision: attention to Earth's dynamic and macro action levels

SOURCE: The Authors adapted from Beck and Cowan (1996)

Nowadays, Spiral Dynamic has been used inside the organizations to identify the workers' consciousness levels, in order to solve internal issues, since each employee has his or her own personality, values and thoughts. In this regard, companies' main challenge is to integrate all their employees around a common goal (COWAN, TODOROVIC, 2005). According to Beck and Cowan (1996), in Brazil, it is very important to create "blue" occupations with an "orange" view, seeking development to a "green" vision. In other words, it´s necessary to create jobs in Brazil with strong rules and moral, stimulating entrepreneurship, aiming the collective good.

1.5 TEAMS AUTONOMY, LEADERSHIP STYLES AND LEVEL OF COSNCIOUSNESS

The three variables presented in this study can be associated with companies and employees' performance in the business environment. The impacts of leadership may be due to the interpersonal relationship interactions that favors or prevents the emergence

of autonomous behavior, making the autonomy a process of social experiences, proposing a participation in the productive process, responsibility, decentralization and opportunities (TREVELYAN, 2001). The company's consciousness levels are stages of growth. Each one of them arises gradually and, when satisfied, transcend to new needs. Therefore, collective consciousness is the organization's reflex, where it is possible to find a group values and behaviors (BARRETT, 2009).

The relationship between teamwork, autonomy and consciousness levels was investigated by Bastos and Cordeiro (2015), who proposed a model that relates these variables. The authors conducted a Systematic Literature Review using all available journals in CAPES database, founding a gap in the literature regarding the interrelations of the three variables to establish the model.

Later, Bastos and Cordeiro (2016) continued the research, elaborating a study that relates the variables leadership profile in teams, autonomy of work within teams, team members' consciousness levels and teams' effectiveness to establish a theoretical-conceptual model. Using Delphi Method, the authors developed a questionnaire and selected 10 experts to answer it. The experts agreed that each person has his or her own values, and it is the leaders' responsibility to identify the interests of their team members to explore their potential, defending the idea that the effectiveness of a particular type of leadership can be affected by team members' values. Besides that, they agreed that the higher the complexity of team members' consciousness level and values, the more effective are the work teams with higher autonomy. Therefore, the authors were able to validate their model, proposed in 2015, that correlates these three variables.

The current research is the continuation of these two previous works, focusing on the development and the validation of a construct for identifying how autonomy levels, leadership styles and team members' consciousness levels impact team performance, in order to, in the future, develop a survey to correlate these variables within teams on the shop floor level of industries located in the metropolitan region in Curitiba.

2 RESEARCH METHODOLOGY

This research is a descriptive study, focused on validating a construct that further will be applied on a quantitative research. The questionnaire validation method was chosen to obtain data that correlates autonomy degrees, leadership styles and consciousness levels with work teams' performance, since through this method, it is possible to obtain a representative population sample (FONSECA, 2002).

Therefore, consciousness levels will be classified as a moderator variable between autonomy degree and leadership style (independent variables) and team's performance. According to Baron & Kenny (1986), moderator variables are important "because specific factors (e.g. context information) are often assumed to reduce or enhance the influence that specific independent variables have on specific responses in question (dependent variable)". In other words, a moderating variable modifies the relationship between the independent and dependent variables (SEKARAN, 2003). To determinate these variables, the consciousness levels spiral was separated in two groups: less complex group (red and blue colors), and more complex group (orange and green colors).

The construct was developed to serve as a basis for future researches, in order to apply it in practical terms. Therefore, after validation, four hypotheses were formulated with the purpose of testing the construct in the industries located in the metropolitan region of Curitiba. The hypotheses are:

- **H1:** For teams with a less complex consciousness levels, greater autonomy is inversely correlated to team performance.
- **H2:** For teams with a less complex consciousness levels, the leaders' performance in a more democratic way, is inversely correlated to team performance.
- **H3:** For teams with a more complex consciousness levels, greater autonomy is directly correlated to team performance.
- **H4:** For teams with a more complex consciousness levels, the leader's performance in a more democratic way, is directly correlated to team performance.

The construct validation was performed through the applications of two questionnaires, one for leadership and one for autonomy, using Cronbach's Alpha as a tool to obtain the reliability of the construct.

The Consciousness levels questionnaire was originally prepared by Don Beck, with the version used by Silva and Nichele (2017) to identify the work team's consciousness levels within an oil and gas company located in Curitiba Metropolitan Region.

Silva and Nichele (2017) conducted a study in oil and gas company, identifying the consciousness levels in the teams. The authors used the adapted questionnaire, separating the results (obtained by the people answers) into four quadrants (personal identification, personal rejection, professional identification and professional rejection), each one representing their positioning. With the collected data, it was possible to find the percentage proportion of each answer. Then, the average between Personal and Professional identifications was extracted, since it is in the identification where

the people main behavior traits were extracted. From the average, and indicator was created to indicate which consciousness level is dominant. The indicator was created according to the following steps:

1. The highest percentage is selected and the value corresponding to the selected color is assigned;
2. The highest result between the results adjacent to the chosen one are selected, and then the proportion of the results is calculated in view of the proportion of the main result;
3. If the adjacent result is above the principal, the proportion between them is subtracted from the principal value. If it is below, the adjacent value is added to the principal value.

The present research will use the adapted questionnaire by Cordeiro and the methods used by Silva and Nichele (2017) to calculate and find the teams' dominant consciousness levels. To measure the employees' consciousness levels, however, the yellow and turquoise levels will not be used in the analysis because no samples of workers on the shop floor with these characteristics are found in the literature (BECK E COWAN, 1996; WILBER, 2000).

To evaluate the leader's autonomy degree and leadership style, the present research is composed of two questionnaires, one for each variable. Correia (2013) conducted a research studying the impact of leadership on employees' satisfaction and performance. She elaborated a questionnaire based on Goleman's leadership styles, in a sample consisting of 100 individuals. The study result demonstrated that the higher the individuals' satisfaction with the bosses' contribution, the more satisfied they are with their own performance. These results corroborate with Goleman's affirmatives, that the leader's actions account for 50 to 70 percent of the employees' feelings about the work environment. The present research adapted Correia's questionnaire in order to establish a score for each question that will be correlated with Goleman's leadership styles. To evaluate the leader's autonomy degree and leadership style questionnaires, Cronbach's Alpha was used as a reliability coefficient.

2.1 CRONBACH'S ALPHA

In 1951, Lee J. Cronbach published an article discussing the internal consistency problems of a scale or a test and the other authors proposals for its calculation (CRONBACH, 1951). Through these deductions, the author presented a formula, capable of estimate a questionnaire reliability applied in a survey, measuring the correlation

between the answers by analyzing the respondents' answers profile. The formula follows bellow:

$$\alpha = \left(\frac{k}{k-1}\right) x \left(1 - \frac{\sum_{i=1}^{k} s_i^2}{s_t^2}\right)$$

Where:

α: Cronbach's alpha coefficient

k: Number of test items

S_i^2: Variance of score on each item

S_t^2: Variance of overall score on the entire test

Cronbach Alpha coefficient has great use and acceptance in the academic environment, being a determining factor for its adoption as a reliability estimation tool (STREINER & NORMAN, 2008). The coefficient normally ranges between 0 and 1, which the closer Cronbach's alpha coefficient is to 1, the greater the internal consistency of the items in the scale, and the negative values should be considered as scales with lack reliability (CRONBACH, 1951).

According to George and Mallory (2003); Streiner and Norman (2008) the minimum acceptable value for alpha coefficient is 0,70; below this value the internal consistency is considered low. In contrast, the maximum value expected is 0,90; above this value, it can be considered that there is duplication, that is, several items are measuring the same element of a construct, and the duplications items must be eliminated. Usually in the research, Alpha values between 0,80 and 0,90 are preferred.

Two questionnaires were formulated to form the construct: one for leadership with fifteen questions (Appendix I), and one for autonomy, with nineteen questions (Appendix II), containing eighty-six responses to the total. The Sphinx program was used to calculate the Cronbach's Alpha, aiming to obtain a satisfactory reliability degree. The software allows more detailed and faster analysis data, correlating questionnaires' variables.

3 RESULTS

The current research aimed on developing and validating a construct to correlate leadership, autonomy and consciousness levels' variables through two questionnaires, both validated by the Cronbach's Alfa coefficient, calculated from Sphinx software.

Initially, a bibliographical review was carried out aiming to deepen the variables that compose this research: autonomy levels, leadership styles and consciousness levels. In this review it was possible to identify the variables correlation, being described firstly by Bastos and Cordeiro (2015) that founded a gap in the literature regarding these variables. Further on, Bastos et al. validated a model based on the gap literature found in the previous research. Based on this model, a construct was developed and gave rise to two questionnaires that are aimed on quantitatively assess the impacts of autonomy, leadership and consciousness levels on team's performance on the shop floor at industries of metropolitan region of Curitiba.

The Leadership questionnaire was developed and released in Google Forms, including 15 questions, using a scale of 1 to 5 on each question, with 73 answers. Thus, the questionnaire was imported into Microsoft Excel and then the Sphinx program performed the data analysis from the questionnaire answers, calculating a 0,72 Cronbach's Alpha coefficient, which validates the questionnaire variables correlation (Exhibit 3).

EXHIBIT 3 – Leadership Cronbach's Alpha

continue

	Média	Desvio-padrão
1. É inspirador – faz com que seus subordinados se sintam úteis e importantes	3,90	1,30
2. Exige sempre perfeição – quer sempre que faça melhor e mais depressa	3,03	1,34
3. Tem por hábito recorrer à opinião dos subordinados em busca de consensos sobre as decisões que tem que tomar	3,67	1,26
4. Esforça-se por manter os subordinados felizes no trabalho – mantém relações amigáveis com quem dirige e cria harmonia	4,16	1,19
5. Controla todas as situações e exige que obedeça de imediato às suas ordens	2,85	1,44
6. O líder define os objetivos de longo prazo, mas deixa seus subordinados com liberdade para inovar, para experimentar e para assumir riscos	3,74	1,29
7. O líder define todos os objetivos sem explicar aos seus subordinados as suas intenções	2,36	1,43
8. O líder da liberdade para fazer o trabalho como seus subordinados acham melhor	3,51	2,34
9. O líder é quem define todos os objetivos e tarefas – transmite a ideia de que não confia na vontade e iniciativa de seus subordinados	2,44	1,46
10. A pressão é positiva porque os subordinados precisam sentir que estão sendo avaliados para cumprir com o que lhes é exigido	2,86	1,36
11. Se o líder exigisse menos de seus subordinados eles teriam uma melhor relação e se empenhariam mais no trabalho	2,75	1,44
12. Em vez de pressionar, o líder deveria confiar mais na competência e sentido de responsabilidade de deus subordinados	3,93	1,19

EXHIBIT 3 – Leadership Cronbach's Alpha

conclusion

	Média	Desvio-padrão
13. O líder contribui para que o desempenho de seus subordinados seja positivo – seria um bom chefe em qualquer empresa	4,16	1,22
14. O líder reconhece e premia os esforços individuais e das equipes	3,93	1,41
15. Interessa-se pelos subordinados e pelos seus problemas – Reserva tempo para conversas pessoais, ouve e dá sua opinião –	3,85	1,41
Alfa de Cronbach = 0,72		

SOURCE: Sphinx Software

The same process was adopted for the autonomy questionnaire, although in this case, there were 19 questions, also on a 1 to 5 scale, with 13 answers. After the responses were imported to Microsoft Excel and analyzed by Sphinx, the Cronbach's Alpha resulted in a 0,92 coefficient, which shows a strong questionnaire variables' correlation (Exhibit 4). Even though there were fewer questions regarding leadership questionnaire and a higher alpha coefficient, this fact is explained by the questionnaire internal consistency, which means that there is greater responses coherence, guaranteeing an excellent construct reliability.

EXHIBIT 4 – Autonomy Cronbach's Alpha

continue

	Média	Desvio-padrão
1. Os operadores possuem autonomia para dividir o trabalho?	3,23	1,09
2. Os operadores possuem autonomia para interromper a produção?	2,62	0,77
3. Os operadores possuem autonomia para definir o ritmo de produção?	2,62	1,19
4. Os operadores possuem autonomia para definir/redefinir o sequenciamento da produção?	2,23	1,01
5. Os operadores possuem autonomia para negociar metas de produção?	2,38	1,39
6. Os operadores possuem autonomia para definir indicadores de desempenho do grupo/indivíduo?	2,23	1,42
7. Os operadores possuem autonomia para acionar a manutenção?	3,15	0,99
8. Os operadores possuem autonomia para responsabilizar-se por manutenção primária?	3,31	1,44
9. Os operadores possuem autonomia para rejeitar matéria-prima não conforme?	3,15	1,52
10. Os operadores possuem autonomia para escolher e formalizar liderança(s) interna(s)?	3,00	1,15
11. Os operadores possuem autonomia para planejar escalas de treinamento?	2,46	1,51
12. Os operadores possuem autonomia para reunir-se quando necessário?	2,92	1,19
13. Os operadores possuem autonomia para influenciar na entrada e saída de membros?	2,38	1,56

EXHIBIT 4 – Autonomy Cronbach's Alpha conclusion

	Média	Desvio-padrão
14. Os operadores possuem autonomia para avaliar o desempenho da equipe e seus membros?	2,92	1,44
15. Os operadores possuem autonomia para controlar frequência e alterar faltas?	1,69	1,18
16. Os operadores possuem autonomia para assumir relações de interface internas e externas?	2,69	1,60
17. Os operadores possuem autonomia para administrar o orçamento do setor?	1,92	1,19
18. Os operadores possuem autonomia para influenciar na direção do negócio?	2,08	0,95
19. Os operadores possuem autonomia para influenciar no planejamento da empresa?	1,92	0,95
Alfa de Cronbach = 0,92		

SOURCE: Sphinx Software

Comparing both, it is possible to identify the reason why the autonomy questionnaire had a higher alpha coefficient: the values shown in blue in exhibit 2 and exhibit 3 mean above average questions, meanwhile, the red values mean below average questions. However, leadership questionnaire had only two questions in the average, with the others thirteen questions varying in above and below average, unlike the autonomy questionnaire, which had only two questions above average, and two questions below average, showing in practical terms that there is greater consistency in this questionnaire, and consequently, a higher Cronbach's Alpha value.

The deepening themes of leadership, autonomy and consciousness levels allowed to formulate the questionnaires and the construct validation (objective of this research). Even with different coefficients, the results were enough to validate it, allowing the continuation of the main research by the implementation of a survey to characterize the impacts of autonomy levels, leadership styles and consciousness levels on teams' performance at the shop floor level of industrial companies in the Curitiba Metropolitan Area.

CONCLUSION

This work is part of a greater research project aimed to identify the impacts of autonomy levels, leadership styles and consciousness values on teams' performance at the shop floor level of industrial companies in the Curitiba Metropolitan Area (BASTOS AND CORDEIRO, 2015; BASTOS et al., 2016). It focuses on the development and validation of a construct that will be used to conduct a survey with work teams within industrial companies in the Curitiba Metropolitan Area.

The authors performed a bibliographical review to have a better knowledge of the study variables and only formulate the construct. The leadership styles described by Goleman were synthetized and used as a basis for leadership questionnaire development, aiming to define a predominant style among the others. The autonomy form was also developed with this intention, allowing to formulate next research hypothesis.

Initially, the questionnaires received a large number of questions. Thus, number of questions were reduced in order to allow the questionnaire to be answered in a shorter time span. After that, the challenge was to reach a significant number of answers to obtain an alpha coefficient that could validate the model.

To achieve the research objectives, the authors used the Sphinx Software to calculate Cronbach's Alpha to validate the construct reliability. With a 0,72 coefficient for leadership questionnaire and 0,92 coefficient for autonomy questionnaire, research objectives (construct development and validation) were achieved.

Regarding future research, the results found will enable the authors to develop a survey with teams at the shop floor level within industrial companies in the Metropolitan Region of Curitiba. Its findings also enable other researches to apply the validated construct in different organizational contexts, in order to seek a broader generalization of surveys' results.

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