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Spanish validation of the Benchmark Resilience Tool (short-form version) to evaluate organisational resilience

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ABSTRACT

Organisational resilience (OR) is an organisation's ability to plan, respond to and recover from emergencies and crises. Evaluating resilience allows organisations to increase their level of awareness of the environment as well as their ability to react to threats. However, the research carried out in this field has been mainly theoretical, and there are few quantitative tools to measure it. The purpose of this study was to adapt and validate the short-form version of the Benchmark Resilience Tool into Spanish language and to explore its relationship with safety climate. A sample of 388 Spanish workers from two highly reliable sectors was used: healthcare and nuclear energy. Internal consistency analyses, test-retests, confirmatory factorial analysis (CFA), exploratory structural equation modelling (ESEM) and invariance analyses across organisation type and sex were performed. We concluded that the instrument fulfils the psychometric criteria to evaluate resilience in healthcare and nuclear organisations in Spain. We briefly discuss the practical implications as well as some of the limitations and recommendations for future research.

Below we present the review of the relevant literature to define the objective of the study. Subsequently, the method was presented in Section 2. Then, in Section 3, the results obtained were presented, followed by their respective discussion in Section 4. Finally, Section 5 were highlighted the main conclusions of the investigation.

1. Introduction

Currently, organisations are dealing with climates of uncertainty which pose serious challenges to individuals, groups and organisations. Resilience is one way of responding to this inevitable adversity as a key behaviour that is strategically linked to the success, growth and survival of the organisation (King et al., 2016).

Organisational resilience (OR) is an organisation's ability to survive and even strengthen in times of crisis (Seville et al., 2008). It is more visible after a natural disaster; however, in everyday life, organisations have to handle a variety of crises (financial difficulties, large-scale products, failures in the supply chain, industrial accidents, etc.), in which organisational resilience may be less visible but is nonetheless extremely important (Stephenson et al., 2010).

One of the main benefits of evaluating resilience in organisations is that it increases the level of awareness of its climate (both internal and external) and allows the organisation to identify its main vulnerabilities as well as its action priorities in emergency situations (Seville, 2008; Villemain and Godon, 2016). Furthermore, levels of resilience are positively related to the organisation's safety (Bergström et al., 2015; Pillay et al., 2015), reliability (Madni and Jackson, 2009; Weick and Sutcliffe, 2007) and competitiveness (Lee et al., 2013).

Even though resilience has been thoroughly examined theoretically through the development of models and case studies in organisations (Annarelli and Nonino, 2016; Bhamra et al., 2011; Madni and Jackson, 2009), the survey methodology has received little attention, and there are just a handful of studies that attempt to quantify it (Righi et al., 2015; Tamvakis and Xenidis, 2013).

1.1. Instruments to measure organisational resilience

There are currently several questionnaires in the literature that measure organisational resilience with different empirical support. Some studies have attempted to evaluate the construct through different dimensions or indicators (Kantur and Iseri-Say, 2015). Below is a summary of different studies which have sought to measure organisational resilience.

Mallak (1998) designed a questionnaire based on Weick's model

(1993) with a sample of 128 nursing managers and identified six indicators: the quest for goal-oriented solutions, avoidance or scepticism, critical understanding, a system of roles, sources of resilience and access to resources. Somers (2009) expanded upon this study with 142 workers in public organisations to develop the Potential Organisational Resilience scale. In addition to the six factors of the original questionnaire, the following were added: decision-making structure and centralisation, connectivity, planning and accreditation.

Shirali et al. (2013) based on the Resilience Engineering model of Hollnagel et al. (2006) developed a questionnaire with 61 items grouped into six dimensions resulting from a principal component analysis: commitment of management, fair culture, learning culture, awareness, preparation and flexibility. Azadeh et al. (2014) designed a questionnaire to measure Integrated Organisational Resilience, which in addition to the six previous factors includes the following dimensions: self-organisation, teamwork, redundancy and tolerance of error. They administered the instrument to 115 workers at a company in the petrochemical sector. They concluded that this instrument not only provides quantitative data on resilience but also enables the organisation's safety to be improved.

Stephenson et al. (2010) developed a quantitative methodology to measure indicators of organisational resilience based on qualitative work via an extensive literature survey conducted by McManus et al. (2008). Based on both studies, Lee et al. (2013) developed the Benchmark Resilience Tool (BRT-53) a questionnaire tested on a random sample of 68 organisations in the Auckland region of New Zealand. Through an exploratory factor analysis, the 53 items representing 13 theoretical indicators were grouped into two factors: planning and adaptive capacity. Planning implied the use of predetermined planning capacities for the continuity of the business and risk management initiatives. Adaptive capacity was associated with the ability to deal with the organisation's needs before they become critical, and it emerges as a result of strong leadership and culture.

More recently, Brown et al. (2017) administered an improved version of the Benchmark Resilience Tool (BRT-53) to 18 critical-infrastructure organisations (electricity, telecommunications, gas and fuel, roads, rails, ports and water) with the purpose of evaluating their organisational resilience. Through principal component factor analysis with varimax rotation, they performed a previous validation of the questionnaire and found a single factor. According to these authors, this structure does not necessarily exclude the two-factor structure of the original scale, which has been proven in organisations from a wide variety of sectors. Indeed, the one-dimensional structure may be a characteristic of critical-infrastructure organisations and should be the focus of future studies.

The Benchmark Resilience Tool (BRT-53) provides organisations with relevant information on their resilience strengths and weaknesses. However, it has several limitations associated with its length, which motivated Whitman et al. (2013) to develop a short-form version through two validation procedures. The 13 items that best represented each of the 13 indicators measured on the original scale were chosen by a panel of seven experts (BRT-13A) and via statistical analyses (BRT-13B). Both questionnaires were tested in three samples in New Zealand. Correlations were calculated between the BRT-53 and the two shorter versions by evaluating the scores on Total Organisational Resilience and on each factor individually (adaptive capacity and planning). Even though the two short-form versions provided valid results similar to the original scale, the BRT-13B version is highly recommended.

Sharma and Sharma (2015) evaluated the psychometric properties of the short-form version of the Benchmark Resilience Tool (BRT-13B) in a sample of 160 employees of twelve Information Technology (IT) companies located in India. The results supported the original two-factor structure, reliability and validity of the BRT-13B instrument for measuring the resilience of executives in this kind of company.

Specifically in Spain, no organisational resilience questionnaire has been identified. Therefore, it is necessary to have an instrument that allows Spanish organisations to evaluate their resilience indicators. For this reason, the BRT-13B questionnaire was selected considering its theoretical model, its validation methods (quantitative and qualitative) and the practical benefits associated with a reduced version, described above. The present study has been designed with the objective of validating the Spanish version of the BRT-13B and determining its relationship with the safety culture as a form of concurrent validity, based on the assumption that both constructs could be associated according to the literature, as below.

1.2. Safety culture

The term "safety culture" was first introduced in 1991 by the International Atomic Energy Agency (IAEA) after their inquiry into the Chernobyl nuclear power plant disaster in 1986. "Safety culture denotes the assembly of characteristics and attitudes in organizations and individuals which establishes that, as an overriding priority, nuclear plant safety issues receive the attention warranted by their significance" (IAEA, 2002).

A large number of definitions of safety culture have been developed (Cox and Cox, 1991; Pidgeon, 1991; Geller, 1994; Lee, 1996). It relates to the core assumptions that organisational members hold concerning safety issues; it is expressed through the beliefs, values and behavioural norms and it is evident in company safety policy, rules and procedures (Mearn and Flin, 1999; Clarke, 2000). Although there is no universally accepted definition of positive safety culture, commonly it is regarding to a shared understanding that safety is a priority (Clarke, 2003).

On the other hand, the concept of safety climate refers to the beliefs, values, and perceptions about safety that are shared within a specific group (Zohar, 1980; Cooper and Phillips, 2004). Weigmann et al. (2002) argue that safety climate is a psychological phenomenon, which is usually defined as the perceptions of the state of safety at a particular time, it is a temporal phenomenon, relatively unstable and subject to change.

In a systematic review of the literature, Guldenmund (2000) has found that some authors perceived safety climate and culture as the same phenomenon, while many perceive the two as separate constructs. It is concluded that safety climate might be considered an alternative safety performance indicator.

Safety climate has a narrower focus than safety culture and exists closer to operations, being characterized by day-to-day perceptions towards the working environment (Bhattacharya, 2015). Also Wiegmann et al. (2004) viewed the safety climate as a measure of the safety culture, which provides "quick snapshot" of the workers' perceptions of safety (Yule et al., 2007; Shannon and Norman, 2009). Recently, Do Nascimento et al. (2017) argue that a significant number of assessment the safety culture based on safety climate questionnaires, have been published in health and 'safety at work' areas.

Although an exhaustive review in this regard, is not the objective of this study, it is worth mentioning the following questionnaires: Pharmacy Safety Climate Questionnaire (PSCQ) by Ashcroft and Parker (2009), el Safety Attitudes Questionnaire (SAQ) by Sexton et al. (2006), The Nordic Safety Climate Questionnaire (NOSACQ-50) by Kines et al. (2011) and Organisational-Level Safety Climate scale by Zohar and Luria (2005).

In this study, we used the Spanish adaptation developed by Martínez-Córcoles et al. (2011) of the Zohar and Luria (2005) questionnaire. According to the previous literature, safety climate was considered a way to measure the safety culture, with the aim of providing an indicator of concurrent validity of the BRT-13B, based on the assumption that they are constructs could be related. In the next section we present the arguments of this possible relationship.

1.3. Organisational resilience and safety culture

The interest in the study of resilience and safety of organisations has