



## Process standardization and error reduction: A revisit from a choice approach

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### ABSTRACT

This study aims at advancing our understanding of the conditions under which standardization is associated with error reduction. Specifically, we identify a particular condition, referred to as employees' choice, which is associated with standardization. Standardization can, on the one hand, weaken the employees' choice by guiding them to operate uniformly and follow instructions in order not to make errors. On the other hand, counter-intuitively, standardization creates and strengthens situations of choice because employees decide the extent to which they adhere and execute said standardization. Following the choice approach, we distinguish between employees' perception of their unit's standardization rigidity as planned by their managers, and employees' actual adherence to standardization. We also refer to the situation in which, contrary to the use of standardization while enabling employees to cope with unexpected situations, organizations directly increase their employees' choice by encouraging them, especially professionals, to use and rely on their own discretion. Our study was made possible through the participation of 298 nurses from 37 departments in two hospitals. The results show that choice plays a significant role in determining the relationship between standardization and error reduction. The highest level of error reduction is found in circumstances in which employees are granted a high degree of discretion, standardization rigidity is intermediate and, as a result, adherence to standardization is high. Situations of high levels of standardization rigidity are not associated with error reduction.

### 1. Introduction

Errors in organizations are essentially unintended and potentially avoidable deviations from organizationally-specified goals and standards that can yield either adverse or positive organizational consequences (Frese and Keith, 2015; Hofmann and Frese, 2011). Errors harm organizational performance. Taking into consideration that a complete prevention of errors is impossible and that errors will always occur, the effort to continuously improve performance-wise is aimed at reducing the number of errors over time (Frese and Keith, 2015; Lei et al., 2016).

Processes standardization (to be distinguished from product and technology standardization, which deals in specifications for products or technologies; Sidak, 2015. Hereinafter, "Standardization") is one of the most acceptable common practices used to improve organizational performance (Naveh, 2007; Naveh and Marcus, 2005) and specifically to reduce error rates (Katz-Navon et al., 2005; Lei et al., 2016). A process that is standardized is constantly performed following the same steps in the same sequence. Standardization is achieved by setting formal rules to guide employees' activities, which are operationalized in

organizations by means of work instructions, guidelines, manuals, and work procedures.

Standardization assists in eliminating errors because it is a repository of organizational memory and expresses the best available knowledge and past experience (Haynes et al., 2009). Standardization turns the best available organizational knowledge into a formal routine and repetitive pattern of interdependent organizational actions (Parmigiani and Howard-Grenville, 2011; Ortmann, 2010). It brings control and coordination, improves knowledge transfer among employees, and provides a sense of structure and sequence to work that reduces ambiguity and eliminates forgetfulness and confusion (Naveh, 2007). In this sense, standardization is a good way to achieve employee homogeneity, uniformity, and coordinated activities, all of which are important for error reduction.

However, reports of reduced error rates are rare (e.g., in the health care sector; Makary and Daniel, 2016), and studies suggest the existence of more complex relationships between standardization and the occurrence of errors (Lei et al., 2016). Standardization allows employees to master their tasks better, but coercive standardization functions as a means by which management attempts to coerce

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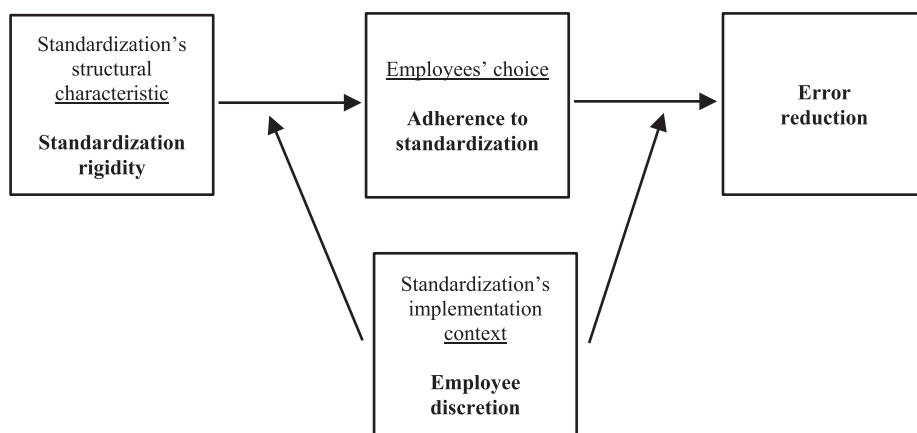


Fig. 1. Research model: the relationship between standardization and error reduction.

employees' efforts and compliance, and it has only a partial positive association with performance (Adler and Borys, 1996). When standardization impairs flexibility and employee discretion it may even be associated with more errors, because flexibility and discretion are required in order to react to uncertainty and unexpected situations (Katz-Navon et al., 2005). In contrast, certain studies suggest that there is a low risk of more standardization, compared to less, harming organizational performance (Davis et al., 2009).

In this study we combine the theories of standardization (Katz-Navon et al., 2005; Naveh and Marcus, 2005), errors in organizations (Lei et al., 2016), and decision making and choice (Yates and Potworowski, 2012) in order to enhance our understanding of the conditions under which standardization is associated with error reduction, and to explain earlier inconsistent results on the relationship between standardization and errors. Specifically, we identify conditions referring to employees' choice as a way to manage the paradox of the simultaneous existence of structure and flexibility and its association with error reduction. The need to balance between constrains and flexibility is a paradox organizations struggle with (Harrison and Rouse, 2014). To date, studies related to the structure-flexibility paradox refer to economic efficiency and innovation performances but neglect the association of this paradox with errors (Miron-Spektor et al., 2011).

Flexibility implies that a work process is different under varying conditions, and that these conditions themselves create the need for such differences. Earlier studies refer to flexibility within a context of adherence to standardization, i.e., once standardization is implemented and employees fully adhere to it. We refer to the structure-flexibility paradox in which, on the one hand, standardization weakens the employees' choice because it makes them operate uniformly and adhere to specific instructions in order not to make errors. However, on the other hand, and counterintuitively, standardization also creates and strengthens situations of choice. This is because employees may choose not to adhere to standardization, to break the rules, or to deviate from standards (Ballard et al., 2016; Lehman and Ramanujam, 2009; Martin et al., 2013). This occurs, for example, when they discover ways to carry out work that are more efficient or achieve better results than those mandated by the organization's formal standards.

Thus, as good as standardization can be, it is only a plan or a design, and for standardization to be associated with error reduction this is not enough (Naveh and Marcus, 2005; Tatikonda and Montoya-Weiss, 2001). Earlier studies make only a partial distinction, if any, between standardization rigidity, e.g., the extent to which a standard is detailed and inflexible, as it is planned by managers and perceived by employees (Naveh and Marcus, 2005) and as a main characteristic of standardization design, and employees' adherence to standardization, that is, standardization execution. Thus, they neglect the issue of employees' choice to decide whether to execute the rules and procedures. A common hidden assumption in organizational standardization studies is

that employees simply follow the rules and procedures (Martin et al., 2013; Naveh, 2007). However, this is not the true situation, and a gap does exist between a plan and adherence to it, and not only in the form of rare and forbidden rule-breaking phenomena (Katz-Navon et al., 2005; Lehman and Ramanujam, 2009; Martin et al., 2013). A gap exists between formal written rules and procedures and their execution because the employees' behavior is not separate from choice, and they choose their manner of behavior at any time (Glasser, 2010), and specifically the extent to which they follow procedures. Thus, given the choice approach, to explain the relationship between standardization and errors we distinguish between standardization rigidity and adherence to standardization.

The increased use and rigidity of standardization leads to the elimination of flexibility in employees' activities. Alongside this trend, organizations also increase their employees' choice directly by encouraging them to use their discretion and thus enabling them to cope with unexpected situations. This means that standardization and rule-breaking may be permitted or contested by those charged with standardization enforcement (Martin et al., 2013).

The gap between the level of standardization rigidity and executed standardization is particularly characteristic of professionals doing uncertain work like doctors and nurses in the health care system (Stern et al., 2008). Taking hospital departments as an example, this paper explores the relationship between standardization and medical errors.

## 2. Standardization and error reduction: Theory

In exploring the relationship between standardization and errors through the perspective of the choice approach, we refer to three factors that characterize modern work in organizations: standardization rigidity, adherence to standardization, and employees' discretion. We refer to the structure and context of standardization. Standardization rigidity refers to a structural characteristic of standardization, and employees' discretion refers to a characteristic of the context in which standardization is executed. The relationship between structure and context of the standardization are associated with employees' adherence to standardization and with error reduction, as described in Fig. 1.

### 2.1. How is standardization rigidity associated with adherence to standardization?

Standardization rigidity refers to employees' perception of the standardization as it is planned and designed by managers. It relates to the degree to which planned standardization is defined and stated in an inflexible, precise, detailed, and strict manner. The more the planned standardization is not easily modified, the more rigid it is (Gilbert, 2005). Employees' perception of standardization rigidity is a

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