Cushioning the Blow: Labour Flexibility and Retaining Firm Innovativeness in Times of Downsizing

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Abstract

Innovation in developed countries is known to suffer from downsizing. Despite the importance of innovation for firms in developing countries and their frequent practice of downsizing, the impact of the latter on the former is yet unverified. Moreover, little is known about how to overcome potentially related innovation obstacles. We close this research gap with a study across nine developing countries in Africa and South Asia. We put forward that labor flexibility (numerical, functional, and wage and reward flexibility) can mitigate the negative effect of downsizing on process innovation. To test this idea, we use a firm-level data set that combines the World Bank’s Enterprise Survey and Innovation Follow-up Survey for 2,988 firms. As expected, we find downsizing to be detrimental to process innovation. Labor flexibility, however, allows firms to remain innovative despite downsizing. More specifically, both numerical flexibility (temporary employment) and functional flexibility (training) can buffer the negative impact downsizing has on innovation.
Cushioning the Blow: Labour Flexibility and Retaining Firm Innovativeness in Times of Downsizing

Firms increasingly engage in downsizing, “the elimination of jobs in an organization” (Chadwick et al., 2004, p. 405) with the goal to increase efficiency, cut costs (McKinley et al., 2000) or align a firm’s structure with its strategy (Aalbers and Dolsma, 2014; Datta et al., 2010). Still, the vast majority of downsizing firms experience a decrease in performance rather than the desired increase (Guthrie and Datta, 2008; Hansson and Gandolfi, 2011). Furthermore and more specifically, downsizing is detrimental to creativity (Amabile and Conti, 1999) and innovation (Dougherty and Bowman, 1995; Gandolfi and Oster, 2009; Marques et al., 2014). Innovation, however, is pivotal for firms’ competitiveness (Michie and Sheehan, 2005), and it is a driver for economic growth and social welfare. As such, innovation is especially critical for firms in developing countries (OECD, 2012; Peerally et al., 2018). Process innovation in particular can be a way for firms to increase efficiency, decrease cost and secure competitive advantage (Davenport, 1992), which makes it essential for firms operating in this context. Consequently, understanding the thus far unstudied impact of downsizing on process innovation in developing countries as well as finding ways to overcome potentially detrimental effects is essential.

Studies conducted in developed countries suggest that certain organizational practices such as improving communication (Chadwick et al., 2004) or increasing perceived organizational justice (Spreitzer and Mishra, 2002) can reduce the negative impact of downsizing (Amabile and Conti, 1999). We expand these insights and shed light on whether labor flexibility mechanisms are appropriate organizational practices to mitigate the innovation challenges firms face after downsizing. Labor flexibility refers to a firm’s
ability to respond to changes in market conditions (Wright and Snell, 1998), primarily by the means of three firm-level instruments: numerical, functional, and wage as well as reward flexibility. Numerical flexibility refers to firms’ ability to vary the amount of labor employed, through e.g. temporary employees. Functional flexibility encompasses firms with a workforce capable of accomplishing an extensive range of tasks by nurturing employees’ knowledge and skills through training. Wage and reward flexibility is established by having compensation systems such as bonuses and performance-related pay in place, which encourage and reward improved performance (Michie and Sheehan, 2005).

This study enriches existing research by assessing how different forms of labor flexibility can soothe the proposed negative effect of downsizing on firms’ level of process innovation. The contributions of our study are threefold. First, studies identifying organizational practices that enable firms to remain innovative despite downsizing are still scarce (Aalbers and Dolsma, 2014; Chadwick et al., 2004; Love and Nohria, 2005). One thus far understudied organizational practice, which warrants special attention in this context, is labor flexibility. Labor flexibility allows firms to quickly react to changes in the environment (Arvanitis, 2005) and to flexibly reconfigure their resource base in the face of change (Wright and Snell, 1998). There are many ‘threatening aspects of change inherent in downsizing’ (Mishra and Spreitzer, 1998, p. 582). It is thus especially intriguing to shed light on whether labour flexibility can help firms to react to these changes and to overcome the innovation challenges brought about by downsizing.

Second, most research on downsizing has focused on large firms (Amabile and Conti, 1999; Marques et al., 2014; Mellahi and Wilkinson, 2008). However, downsizing also regularly occurs in small and medium enterprises (SMEs) (The World Bank, 2018). In
SMEs, the relationship between firm members is particularly close (Torres, 2011), often even familial. Therefore, and given their informality, small firms frequently depend on psychological contracts to govern employment relationships (Nadin, 2007). Psychological contracts specify the unwritten mutual obligations between a firm and its employees (Rousseau, 1989). Downsizing is widely found to result in a breach of employees’ psychological contract (Arshad and Sparrow, 2010; Conway et al., 2014; Datta et al., 2010). This has widespread negative implications for employees’ commitment, motivation and innovation-related behaviors (Ng et al., 2010). Given the close ties between all parties involved and the importance of psychological contracts, the consequences of downsizing are especially traumatic in small firms (Torres, 2011). Shedding light on the relationship between downsizing and innovation is therefore particularly interesting in SMEs and sets our research apart from previous studies.

Third, the context of developing countries is both highly unique as well as understudied (George et al., 2016). Given the importance of innovation for developing countries (OECD, 2012) and the frequent practice of downsizing (The World Bank, 2018), it is crucial to study the relationship between the two in this specific context. Two characteristics of developing countries are especially relevant for our study, namely the time perspective of employees and the availability of human capital. Time perspective refers to the non-conscious process of assigning personal experiences to temporal time frames such as past, present or future (Fieulaine and Apostolidis, 2015). Employees challenged with the hardship of poverty in developing countries are frequently found to have a short time perspective (Moseley, 2001), which is expected to change their reaction to the use of labor flexibility practices. Furthermore, developing countries face a scarcity of human capital.
Human capital refers to the knowledge, information, ideas and skills of individuals (Wright and McMahan, 2011). In developing countries, getting access to the human capital required for successful innovation (van Uden et al., 2017), is frequently a considerable challenge for firms. This struggle is expected to be relevant for the moderating relationship proposed in this study.

Overall, our research contributes to a more nuanced investigation of the impact downsizing has on process innovation with a particular emphasis on the interaction between different labor flexibility forms. By conducting a quantitative study across nine developing countries in South Asia and Africa, we apply a mainstream theory to a non-mainstream context (George et al., 2016). Our study aims at equipping decision makers with managerial knowledge on the effect of downsizing on process innovation as well as on how to remain innovative despite downsizing.

THEORY AND HYPOTHESES

Innovation and downsizing

Innovation is key – not only for highly technologically advanced firms in developed countries but also for small firms in developing countries (Zanello et al., 2016). This insight is supported by the finding that “the build-up of innovative capacities has played a central role in the growth dynamics of successful developing countries“ (OECD, 2012). Innovation can differ in its degree of radicalness and can take various forms such as new products, processes, as well as marketing or organizational methods. The minimum requirement to qualify as an innovation is to be new (or significantly improved) to the firm, even if adopted from other firms (OECD, 2005). In this study, we focus on process innovation, which refers to the “implementation of a new or significantly improved production or delivery method.
This includes significant changes in techniques, equipment and/or software” (OECD, 2005). The focus on process innovation is especially intriguing for the following reasons: first, previous research has primarily focused on assessing the effect of downsizing on product innovation (Dougherty and Bowman, 1995; Mellahi and Wilkinson, 2010, 2008). Insights into the effects on process innovation are still scarce. Second, downsizing harms employees’ psychological contract and as a consequence their motivation and commitment. The decrease in motivation and commitment is expected to be especially detrimental to process innovation: in contrast to product innovation, which is usually conducted in dedicated R&D departments, process innovation requires the motivation and willingness of employees across different functions to engage and contribute (Arshad and Sparrow, 2010). Third, downsizing results in the loss of firm-specific knowledge. This poses a significant challenge for process innovation as employees’ insights into existing processes as well as understanding of the newly introduced procedures is vital for its success (Boer and During, 2001).

Innovation has been frequently found to suffer from downsizing (Dougherty and Bowman, 1995; Marques et al., 2014). Downsizing is “a complicated and multifaceted phenomenon” (Hansson and Gandolfi, 2011, p. 502) with a diverse set of definitions, causes and consequences. The definition of downsizing depends on how wide versus narrow one’s view on this phenomenon is: “In its narrowest sense, downsizing can be viewed as a set of activities introduced to make a firm more cost-effective. In its widest sense, downsizing may be seen as a complete strategic transformation intended to change an organization’s design, its work processes, corporate culture, values and attitudes, and mission” (Hansson and Gandolfi, 2011, p. 501). Notwithstanding different
conceptualizations of downsizing, one common thread is the general understanding that it reflects a proactive strategic choice. With that, it is distinct from organizational decline, which is an involuntary and reactive erosion of the resource base driven by financial pressures (McKinley et al., 2000). Even though our conceptualization of downsizing focuses on the elimination of positions in a firm, we also account for the degree of strategic transformation a firm is undergoing and the financial pressure it is facing.

Ample research has established that the negative consequences of downsizing occur largely due to a breach of employees’ psychological contract (Arshad and Sparrow, 2010; Conway et al., 2014; Datta et al., 2010; De Meuse et al., 2004; Morrison and Robinson, 1997). Psychological contracts are unwritten mutual obligations between a firm and its employees, to which both parties are expected to adhere (Rousseau, 1989). Frequently, the social exchange theory (Blau, 1964) is used to explain the negative effect of psychological contract breach (Restubog and Bordia, 2006). In short, the exchange between two parties is marked by reciprocity. If someone does something advantageous to another party, the receiving party is indebted by social convention to the return the courtesy (Gouldner, 1960). When employees however feel that their employer does not fulfill his contribution to the social exchange and his obligations as part of the psychological contract (Restubog and Bordia, 2006), a wide range of negative consequences are to be expected. This includes increasing “job insecurity, decrease in innovative efforts, lost motivation and commitment to the organizational goals” (Marques et al., 2014, p. 931). Especially employee commitment and motivation are critical components for innovation (Marques et al., 2014).

Despite the above outlined insights into psychological contract breach, “our understanding of the association between downsizing and innovation is very limited”
(Mellahi and Wilkinson, 2010, p. 2292). Given the use of downsizing as a management practice in the countries participating in our study (The World Bank, 2018) and the importance of innovation for the economic growth of developing countries (Zanello et al., 2016), a better understanding of how firms can remain innovative in a downsizing environment is vital.

**Downsizing and Labour flexibility**

Previous research suggests that the impact of downsizing is contingent on the organizational practices by which it is accompanied. For instance, Love and Nohria (2005) find downsizing to be more effective if it is embedded in organizational redesign. Furthermore, Aalbers and Dolfsm (2014) propose that understanding both the formal as well as informal networks in an organization is critical to minimize the negative impact of downsizing on innovation. Moreover, managers’ trustworthiness, perceived organizational justice (Spreitzer and Mishra, 2002) as well as adequate communication (Chadwick et al., 2004) are suggested to play an important role in determining the degree to which downsizing affects a firm. No research to date has however assessed whether labor flexibility can be a means to mitigate the negative impact downsizing has on a firm and more specifically, on its innovative performance. Labour flexibility is expected to be an especially suitable organizational practice in this context for the following reasons: Labor flexibility, such as numerical, functional, and wage and reward flexibility, refers to a "firm’s ability to quickly reconfigure resources and activities in response to environmental demands” (Wright and Snell, 1998). It is frequently found to have a considerable impact on a firm’s ability to adjust to change and to drive innovation (Arvanitis, 2005). As drastic
change is inherently linked to downsizing (Mishra and Spreitzer, 1998), labor flexibility is expected to help firms overcome the therewith associated innovation challenges.

We expect the moderating relationship of labor flexibility to be influenced by two context specific characteristics of developing countries. First, individuals in developing countries have a comparably short time perspective. Zimbardo’s (1999) time perspective theory refers to the non-conscious processes of assigning personal experiences to temporal time frames, such as past, present and future. Time perspective is “deeply rooted in the social contexts individuals live in. When facing poverty […] or socioeconomic insecurity, people are prone to psychologically leave out the future, and to restrain their time perspective to present or past” (Fieulaine and Apostolidis, 2015, p. 213). Moreover, individuals living in poverty are often primarily concerned with immediate survival (Moseley, 2001). Therefore, poverty as faced in developing countries, is frequently associated with a shortening of one’s time horizon to reduce the distress created by the anticipation of future hardship (Laajaj, 2017). Our view is in line with Haushofer and colleagues: “not individuals are to blame for trading considerable future benefits for marginal immediate rewards (short time perspective), but rather the environment of poverty into which one happens to have been born […] On this view, any of us might be poor if it were not for certain environmental coincidences” (Haushofer and Fehr, 2014, p. 862).

Second, we expect the scarcity of human capital in developing countries to be relevant for the proposed moderation effect of labor flexibility. Human capital, a concept which was originally put forward by Becker in 1964, refers to the knowledge, information, ideas and skills of individuals. At the firm level, human capital is frequently assessed by the
educational degree employees hold (Wright and McMahan, 2011). In developing countries, access to schooling and education is often restricted. Furthermore, frequently education systems need to change to prepare graduates for being able to effectively contribute to innovation (Cheng and Yiu, 2016). Firms therefore often struggle to find adequately educated employees (van Uden et al., 2017). Given the importance of knowledge for innovation, this lack of human capital poses a considerable challenge for firms’ innovation ability (George et al., 2016). This context specific lack of human capital is expected to be relevant for the proposed moderating effect of labor flexibility.

As outlined above, the time horizon and human capital of employees in our study are specific to developing countries. We account for this specific context when developing our hypotheses. We elaborate on the three proposed moderation effects of labour flexibility (numerical, functional, wage and reward flexibility) on the relationship between downsizing and process innovation in the following sections.

### Organizational downsizing, numerical flexibility and innovation

We expect numerical flexibility to limit the detrimental effects of downsizing on process innovation. Numerical flexibility refers to a firm’s ability to adapt the number of employees by making use of non-standard working arrangements such as temporary employment (Michie and Sheehan, 2005). When solely focusing on the direct effect of numerical flexibility on innovation, there is a high level of ambiguity with regards to its direction and strength (Martínez-Sánchez et al., 2009). On the one hand, scholars point to the risks of numerical flexibility for innovation (Beugelsdijk, 2008; Michie and Sheehan, 2005) given the longevity in employees’ capabilities (Barney, 1991) and the path dependency of
innovation (Pavitt, 1991). Furthermore, they emphasize the psychological challenges stemming from the increase in risk, temporary employment entails for employees on an individual level (Guest, 2004). On the other hand, researchers propose numerical flexibility to benefit innovation (Kok and Ligthart, 2014) as it can provide the firm with required external specialized knowledge (Barney, 1999) and fresh ideas (Wachsen and Blind, 2016). In the context of this study, we do not purely focus on the direct impact of numerical flexibility on innovation, we are rather intrigued by the question as to whether numerical flexibility can be an appropriate means to limit downsizing’s negative effect on process innovation. Two streams of thought lead us to make this argument.

First, employing temporary employees is suggested to shield permanent employees from turbulences in a firm’s environment (Aleksynska and Berg, 2016). Therefore, it increases the perceived employment security among permanent employees (van Riemsdijk and de Leede, 2001). Employment security is a critical part of permanent employees’ psychological contract (Rousseau, 2004), which is threatened by the insecurity and instability inherent to downsizing (Guthrie and Datta, 2008). Whereas psychological contract breach leads to a drop in commitment and motivation (Ng et al., 2010), a firm’s efforts to adhere to the obligations specified in the psychological contract are found to increase employees’ commitment (Parzefall and Hakanen, 2010). Ensuring continuous commitment of employees is essential, as it is an important prerequisite for innovation (Marques et al., 2014). Hence, by establishing higher perceived employment security in the specific circumstance of downsizing, we expect numerical flexibility to reduce the negative effects of downsizing on innovation for permanent employees. We expect the abovementioned need for perceived employment security among permanent employees to be especially
strong in developing countries with high levels of poverty: one burden associated with poverty is the fear of future hardship. For employees who are ‘working in order to eat from day to day’ (Laajaj, 2017, p. 188), the instability and threat of employment discontinuation are especially daunting (Laajaj, 2017). Therefore, we expect numerical flexibility to be an especially valuable organizational practice for permanent employees in developing countries.

Second, when focusing on the remaining temporary employees, the impact of downsizing and the therewith associated increase in employment instability (Guthrie and Datta, 2008) is expected to be negligible: the employment relationship between a firm and its temporary employees is frequently described to be transactional in nature. Furthermore, the psychological contract of temporality does not necessarily entail long-term employment security (Rousseau, 2004). Downsizing does therefore not automatically relate to a breach of the psychological contract. Thus, negative effects of psychological contract breach such as a decrease in commitment (De Cuyper and De Witte, 2006) are not expected to apply to temporary employees. These insights are supported by a recent study suggesting that the negative impact of downsizing on firm performance diminishes with an increasing share of temporary employees (Friebel et al., 2016). We expect the above outlined rationale to apply especially to the developing country context of this study: the time perspective of employees in developing countries is comparably short (Laajaj, 2017). Moreover, the length of temporary employment in developing countries typically ranges from one day to a few weeks (International Labour Organization, 2015). Therefore, the length of employment relationship temporary employees expect as part of their psychological contract is reckoned to be shorter than in developed countries. We thus
suppose that downsizing is unlikely to represent a psychological contract breach to temporary employees in developing countries.

We consider the afore discussed benefits of temporary employees during downsizing to be specifically relevant for process innovation: Particularly in SMEs, fewer resources are available for process compared to product innovation (Fritsch and Meschede, 2001). Consequently, process innovation depends to a large degree on employees’ commitment and motivation, which tend to decrease in the course of downsizing (Arshad and Sparrow, 2010). Given the previously outlined advantages of temporary employees for the motivation and commitment levels in a firm, we propose that numerical flexibility can be a means to soothe the negative effect of downsizing on process innovation. We therefore hypothesize the following.

**Hypothesis 1:** The negative effect of downsizing on process innovation is mitigated by numerical flexibility.

### Organizational downsizing, functional flexibility and innovation

We furthermore propose that functional flexibility mitigates the negative effect of downsizing on process innovation. Functional flexibility refers to firms with a workforce able to accomplish a wide range of tasks by fostering employees’ knowledge and skills through training (Michie and Sheehan, 2005). Functional flexibility in general and employee training in particular are a means to expose employees to a broad range of knowledge, skills and perspectives. They allow for employees to be flexibly reassigned to different jobs and tasks as per need (Kim and Sung-Choon, 2013). Functional flexibility is
generally found to have a positive impact on innovation levels within a firm (Arvanitis, 2005; Beugelsdijk, 2008; Kok and Ligthart, 2014).

In the context of downsizing, it is pivotal for firms to provide the remaining employees with training to recover from post-downsizing effects (Gandolfi and Oster, 2009; Hansson and Gandolfi, 2015) for two reasons: First, the considerable loss of firm-specific knowledge associated with downsizing (Fisher and White, 2000) is highly challenging for firms as successful “innovation depends on knowledge” (Roper and Hewitt-Dundas, 2015, p. 1327). Training is an important mechanism to inspire internal flows and distribution of knowledge across the remaining firm members. It thus enables both the reconfiguration of existing knowledge (Thornhill, 2006) as well as the creation of new understandings (Kim and Sung-Choon, 2013). Training is of particular importance in the developing country context of this study. One innovation challenge firms in developing countries face is the scarcity of human capital. The overall education and thus knowledge levels in firms operating in developing countries is lower compared to developed countries (Shahin, 2014). Therefore, the additional loss of firm-specific knowledge associated with downsizing confronts firms with considerable innovation challenges. Training is found to be a successful means for increasing the human capital within a firm (van Uden et al., 2017) and it is thus expected to be especially critical for downsizing firms in developing countries.

Second, given the high uncertainty accompanying downsizing, employees perceive the original expectation of employment security and stability to no longer be credible. Therefore, their focus shifts from employment security to employability (Chadwick et al., 2004). Employability at the individual level refers to the capacity and willingness of an employee to remain attractive in the labor market (Carbery and Garavan, 2005). Also, it
entails having the competitive skills necessary to find alternative employment if required (Arocena et al., 2007). By broadening the skillset and knowledge of employees, training is found to play an important role in the process of building employability (Carbery and Garavan, 2005). As it establishes an alternative form of psychological contract centered around employability (Arocena et al., 2007), we expect functional flexibility to buffer the negative effect of downsizing on innovation.

Training as a means to increase employability is especially important in the developing country context of this study. As previously elaborated on, human capital in developing countries is rare (van Uden et al., 2017). Therefore, having received training and with that having higher qualifications than their competition, increases individuals’ employability and sets them apart on the labor market. We expect the increased chance for future employment to be especially important for individuals struggling with poverty and the therewith associated ‘anxiety that is generated by the anticipation of future poverty’ (Laajaj, 2017, p. 189).

In sum and as outlined above, training can on the one side help to establish a new form of psychological contract with the firm centered around employability (Arocena et al., 2007). On the other side it can serve as a step stone for overcoming the knowledge gap (Thornhill, 2006) caused by downsizing (Fisher and White, 2000). The latter is especially important for process innovation given its requirement of knowledge and input from different functions within a firm. Employees’ insights into existing processes as well as understanding of the newly introduced procedures is vital for the success of process innovation (Boer and During, 2001). We therefore propose that functional flexibility can
be a powerful mechanism for firms to have continuous levels of process innovation in turbulent downsizing environments. We hypothesize the following.

Hypothesis 2: The negative effect of downsizing on process innovation is mitigated by functional flexibility.

Organizational downsizing, wage and reward flexibility and innovation

Moreover, we propose that wage and reward flexibility decrease the negative effect of downsizing on innovation. Wage and reward flexibility refers to a firm’s ability to promote improved performance by the means of payment mechanisms such as performance bonuses (Michie and Sheehan, 2005). It specifies the rewards employees can assume to receive in response to their performance and it aims directly at influencing the motivation, behavior and actions of employees (Ederer and Manso, 2013). The direct effect of wage and reward flexibility on innovative performance varies in degree and direction, indicating both negative (Kawai, 2015) and positive consequences (Beugelsdijk, 2008; Ederer and Manso, 2013).

Given its impact on motivation, we expect wage and reward flexibility to positively influence innovation in a downsizing environment for two primary reasons. First, according to the affective events theory (Weiss and Cropanzano, 1996), a negative event such as downsizing, prompts negative emotional reactions. This in turn lead to a decrease of intrinsic work motivation, commitment and work efforts (Marques et al., 2014). A recent case study by Arshad and colleagues (Arshad et al., 2016) suggests that, in a downsizing environment, performance-based pay can be a means to increase the low levels of commitment, motivation and loyalty prompted by downsizing. This is essential as low
motivation and morale are major obstacles to innovation (Mellahi and Wilkinson, 2008). Consequently, we expect that wage and reward flexibility can buffer the negative effect of downsizing on innovation by ensuring continuous levels of commitment and motivation. Second, downsizing frequently implies considerable structural changes, to which employees need to adjust. Wage and reward flexibility is a vital mechanism for encouraging “employees to alter their attitudes and behaviors in a manner that is required” (Kim and Sung-Choon, 2013, p. 108) to accommodate the necessary change in the firm.

Hence, reward systems are both an important means for motivating employees and for channeling their efforts in the desired direction (Pratheepkanth, 2011).

It is especially interesting to assess the role of wage and reward flexibility in developing countries. On the one hand, “People living in poverty, especially in developing countries, have repeatedly been found […] to discount future payoffs […] and] to choose smaller and earlier monetary rewards over larger, delayed ones” (Haushofer and Fehr, 2014, p. 862). The discounting of future payoffs is primarily driven by individuals short time perspective as they are “working in order to eat from day to day” (Laajaj, 2017, p. 188). This may negatively impact employees’ appreciation of future payoffs, such as bonus payments. On the other hand, bonus payments are found to be a suitable means to accumulate wealth. Therefore, bonus payments can be a highly valued financial benefit (Laajaj, 2017). Process innovation, much more than product innovation, requires organizational adaption to the newly introduced or adjusted process by all involved parties in the firm (Boer and During, 2001). Downsizing, however, creates an environment of uncertainty, in which employees are found to be highly resentful and resistant to change (Amabile and Conti, 1999). Considering the potential of wage and reward flexibility to
guide behaviors in a desired direction, we expect it to soften the negative effect of downsizing on process innovation specifically. Consequently, despite the future orientation of wage and reward flexibility and the predominance of short time perspective in developing countries, we therefore propose the following.

**Hypothesis 3:** The negative effect of downsizing on process innovation is mitigated by wage and reward flexibility.

**DATA AND METHOD**

**Data**

We test our hypotheses using combined firm-level data provided by the World Bank’s Enterprise Survey (ES) and Innovation Follow-up Survey (IFS) in nine developing countries in South Asia and Africa (Bangladesh, Ghana, India, Kenya, Nepal, Pakistan, Tanzania, Uganda and Zambia) for the years 2013 and 2014. Until recently, data on innovation in developing countries was hardly accessible and not systematically collected (Ayyagari et al., 2011). The World Bank introduced the ES in 2005 and the IFS, which provides more insights into innovation-specific firm characteristics and practices, in 2011. A recent systematic literature review on innovation in developing countries points to the World Bank’s innovation data being “popular data sets for cross-country firm level analyses” (Zanello et al., 2016). It has therefore been increasingly used in current studies on innovation in developing countries (Barasa et al., 2017; Pezeshkan et al., 2016; Wang and Libaers, 2016).

**Variables**

**Outcome Variable: Process Innovation**
Process innovation is measured by combining three questions of the IFS as to whether an establishment did introduce “any innovative methods of manufacturing products or offering services”, “any innovative logistics, delivery, or distribution methods for inputs, products, or services” and “any innovative supporting activity for processes, such as maintenance systems or operations for purchasing, accounting, or computing”. The combined measure for process innovation is ordinal and ranges between 0 and 3.

**Predictor Variable: Organizational Downsizing**

In previous research, downsizing is accounted for by different measurements. This includes the percentage of workforce reduction, layoff announcements and various binary measures capturing the occurrence of downsizing (Datta et al., 2010). We assess downsizing by whether or not a firm did “Dissolve any units or department”. Firms, that have dissolved units are coded one and firms that have not dissolved units are coded zero. We combine this measurement with the subsequently elaborated on control variables for two reasons. First, in line with their strategic direction, firms may decide to disinvest from one area (face separations, dissolve units) and at the same time invest in another (hire new employees). Consequently, dissolving units and thus eliminating positions may not automatically lead to a reduction of the overall number of employees on an aggregate firm level (Burgess et al., 2001). In our data, this tendency becomes evident when cross-tabulating our measure of downsizing (dissolving units) and tactics of structural recombination (creating a new or merging existing units) on the one hand with a decrease in total employee numbers on the other hand (see Appendix 1). The percentage of firms experiencing an overall workforce decrease is only three percent higher among firms dissolving units compared to the other
two categories of structural recombination. This illustrates that employees can suffer from the previously elaborated on negative effects of downsizing even though the firm’s overall number of employees stay relatively stable. Thus, measuring downsizing by dissolving a unit seems to be a more appropriate choice than focusing on the development of employee numbers (aggregated over business units) over time (Chadwick et al., 2004). Second, including specific control variables allows us to further refine our measurement of downsizing: By controlling for outsourcing, we additionally take into consideration whether a firm’s downsizing efforts are accompanied by alternative selective resource reduction strategies (Dranikoff et al., 2002). Moreover, by including measures on structural recombination, such as merging existing or forming new units, we assess whether downsizing is part of a wider restructuring effort (Hansson and Gandolfi, 2011). We furthermore shed light on whether financial pressure is one of the driving factors for the decision to downsize, by accounting for a firm’s financial performance (McKinley et al., 2000). The refinement of our downsizing measure is discussed in more detail in the description of the therewith associated control variables.

**Moderator: Labor Flexibility**

This study entails three moderating variables representing the three labor flexibility categories: numerical flexibility, functional flexibility as well as wage and reward flexibility.

**Numerical flexibility: temporary employees.** Numerical flexibility is measured by the percentage of temporary employees among the overall workforce. This measurement, which ensures comparability across firms, is in line with previous research (Martinez-
Sánchez et al., 2009). The percentage of temporary employees is captured by the combination of two ES questions, namely “how many full-time temporary employees did this establishment employ” and “how many permanent, full-time individuals worked in this establishment”.

**Functional flexibility: training.** Functional flexibility is measured by the percentage of employees having received formal training. It is assessed with two questions in the ES: first, “did this establishment have formal training programs for its permanent, full-time employees?” and second, “[…] what percentage of permanent, full-time employees of the following categories received formal training?”. Measuring functional flexibility through training is in line with previous conceptualizations (Kok and Ligthart, 2014).

**Wage and reward flexibility: performance bonus.** The use of wage and reward flexibility is captured in the IFS by providing insights into whether or not a firm provided “[…] any performance bonus for employees or managers”. Firms offering a performance-based bonus to their employees are coded one, firms without a bonus scheme are coded zero. Similar measures have been previously employed by Martínez-Sánchez and colleagues (2009).

**Control Variables**

**Country.** The country, a company is operating in is controlled for by dummy variables.

**Firm Size.** Accounting for the enhanced access of big firms to finance and economies of scale (Michie and Sheehan, 2005), we control for the size of a firm. In the ES, firm size is captured by the number of full-time permanent employees, used as a continuous variable in this study.
**Firm Type.** In line with the above discussed research findings on firm size, we additionally control for whether an “Establishment is part of a larger firm” (Beugelsdijk, 2008). Stand-alone establishments are coded zero and establishments, which are part of a larger firm are coded one.

**R&D.** Moreover, as firms’ R&D investment is established to be important for innovation in previous research (Beugelsdijk, 2008; Kok and Ligthart, 2014), it is controlled for in this study. The ES asks participants whether an “establishment spend on formal R&D activities, either in-house or contracted with other companies”. A positive response is coded one and a negative response is coded zero.

**Education.** Education is vital for innovation (Arvanitis, 2005; De Cuyper and De Witte, 2006; Kok and Ligthart, 2014). As previously elaborated on, education levels and thus the availability of human capital pose a considerable challenge for firms in developing countries (van Uden et al., 2017). We therefore control for the education level of employees, captured in the ES by the “percentage of full-time permanent workers who completed secondary school”.

**Technologizing.** Technology input has been previously established to be beneficial for innovation (Arvanitis, 2005). Consequently, we control for the level of technologizing, measured in the IFS by the “percentage of this establishment’s employees [which] regularly uses computers in their jobs, including management”.

**Export.** Moreover, alike previous researchers (Beugelsdijk, 2008; Mellahi and Wilkinson, 2010), we control for whether a firm generates sales from export. The ES provides insights into a firm’s percentage of national sales as well as the percentage of
sales generated from indirect and direct export. A firm is coded zero for national sales only and one for indirect and direct export.

**Outsourcing.** Outsourcing non-core elements in order to focus on a firm’s core strengths (Dranikoff et al., 2002) is controlled for in this study for two primary reasons: First, outsourcing can be complementary to downsizing for achieving one of the previously outlined goals of downsizing, namely increasing efficiency and productivity (Hansson and Gandolfi, 2011). Second, outsourcing has been previously found to significantly impact innovation (Martínez-Sánchez et al., 2009). Thus, accounting for outsourcing activities is insightful both from an innovation as well as a downsizing perspective. We account for whether establishments “contract other firms to perform any activities previously done in-house” (IFS), whereby negative replies are coded zero, positive replies one.

**Reorganization.** Reorganization in a sense of structural recombination refers to both creating new units within a firm as well as merging existing units. Both forms of structural recombination have been previously found to impact innovation (Karim and Kaul, 2015). By means of the IFS, we consequently control for whether firms did “Create a new unit or department” or “Merge any units or department”. Respectively, affirmative answers are coded one, negative answers zero. Moreover, we control for insourcing, assessed in the IFS by whether an establishment did “start doing in-house any activities previously contracted to other firms”. Insourcing is coded one whereas no insourcing is coded zero. Controlling for whether or not firms engage in reorganizing is especially essential for assessing innovation in the downsizing context: downsizing can either be embedded in an overall strategic reorientation of the firm or can be limited to eliminating certain positions within a firm (Hansson and Gandolfi, 2011).
**Financial Performance.** As previously elaborated on, firms downsize both due to strategic reasons (Agwu et al., 2014) on the one side as well as due to direct financial pressure and the desire to reduce costs on the other side (McKinley et al., 2000). To account for financial pressure, we control for the percentage of a firm’s working capital. Working capital can be either financed by “internal funds or retained earnings” or can be borrowed from a third party (ES). We expect a low percentage of the former to be related to experiencing financial pressure to downsize. We can thus identify whether firms downsize as a reaction to financial pressure or whether potentially more strategic decisions are underlying the engagement in downsizing (Hansson and Gandolfi, 2011).

**Statistical Analysis**

We used a Poisson Regression Model to estimate the effects of the independent as well as of the moderating variables on our dependent variable. We tested for multicollinearity by examining the average variance inflation factors (VIFs) of each model. The mean VIF for the three models (1.14, 1.59, 1.83) indicated that multicollinearity is of no concern. Based on their national environment, there is a risk of correlated standard errors of firms operating in the same country. By clustering standard errors, we accounted for this potential violation of independence (Huang, 2016).

**RESULTS**

Table 1 presents the descriptive statistics and pairwise correlations between all variables of this study. We test our hypotheses by estimating a Poisson Regression with robust standard errors, consisting of three models. Model 1, the baseline model, only entails the control variables and serves to appraise the added explanatory value of the control variables.
Model 2 adds the direct effect of downsizing (independent variable) as well as the direct effect of the three types of labor flexibility. Model 3 tests the interaction effects between the three forms of labor flexibility, downsizing and innovation. The results of this estimation are summarized in Table 2.

Model 2 illustrates that downsizing has a significant negative effect on process innovation as depicted in Figure 1. The effect size is such that firms which make use of downsizing face a decline in innovativeness of 0.84 standard deviations. This finding is in line with findings from developed countries (Amabile and Conti, 1999; Dougherty and Bowman, 1995). It provides strong support for both the relevance of this study and the importance of identifying mechanisms for overcoming the negative effects of downsizing on innovation.

Model 3 assesses the interaction effect between downsizing and labor flexibility. Thus, it sheds light on the three proposed moderation effects (Hypotheses 1 to 3). Hypothesis 1 is supported as numerical flexibility, the percentage of temporary employees among the workforce, moderates the relation between downsizing and a firm’s innovation level. This moderation effect is graphically illustrated in Figure 2. At 0 percent temporary employment, downsizing negatively impacts a firm’s innovation level with an effect size of 2.86 SD. With an increase in temporary employees, the negative effect of downsizing on innovation continuously decreases until it reaches a cut-off point at which the negative impact of
downsizing is neutralized by numerical flexibility. The cut-off point is at 31 percent temporary employees among the workforce. Moreover, the graph illustrates that the positive effect of numerical flexibility on a firm’s innovation level is much more prevalent for firms undergoing downsizing compared to firms not undergoing downsizing. Overall, the results suggest a significant positive moderation effect of numerical flexibility: we find that an increasing percentage of temporary employees among the workforce can mitigate the negative impact of downsizing on firms’ innovation levels.

The results of model 3 also support Hypothesis 2. Functional flexibility, the percentage of trained employees, moderates the relation between downsizing and a firm’s innovation level, as graphically displayed in Figure 3. In line with our expectation, the impact downsizing has on innovation differs with varying percentages of the workforce having received training. When firms do not offer training to their employees, downsizing negatively impacts a firm’s innovation level with an effect size of 1.63 SD. Increasing percentages of training shrink the negative effect downsizing has on innovation. The threshold, at which firms with and without downsizing have an equal level of process innovation is reached when 77 percent of the workforce are trained. This finding indicates that training allows firms to soothe the negative effect downsizing has on innovation levels within the firm.
Hypothesis 3 is not supported by the results of this study. Figure 4 illustrates that, independent of whether or not firms undergo downsizing, offering bonuses to their employees and managers and thus providing wage and reward flexibility, leads to an increase in innovation.

Except for insights into the percentage of temporary employees and the percentage on employees trained, our analyses rely on cross-sectional data. Consequently, our data does not allow for a time lag in the measurement of the independent and the dependent variables. To minimize the risk of reverse causality driving our results, we ran two different propensity score estimations, namely [1] propensity score matching, and [2] inverse probability weighted regression adjustment estimation (Model 6 and 7). Both propensity score estimations aim at excerpting treatment effects from observational data (Guo and Fraser, 2015), whereby downsizing can be referred to as the treatment in our analysis. In both model 6 and 7 the effect of downsizing is sizeable and statistically significant. These findings further strengthen our confidence in the conclusions on the relationship between downsizing and innovation we draw.

DISCUSSION

The results of this research point to three important new insights, which are insightful for managers, policy makers and scholars alike. First, our results show that downsizing does
not only harm process innovation in big corporations but also in small firms. Second, we find that process innovation suffers from downsizing, not only as previously established in developed, but also in the specific context of developing countries in Africa and South Asia. Third, we identify an organizational practice, labor flexibility, that can help firms to overcome the innovation challenges brought about by downsizing. More specifically, we find that both numerical flexibility (temporary employment) as well as functional flexibility (employee training), can alleviate the negative impact of downsizing on process innovation. In the following, we discuss the implications of our findings, with special emphasis on the contextual factor of our study being located in developing countries.

First, as previously elaborated on, numerical flexibility moderates the relationship between downsizing and innovation. Thus, it can be a means for firms to remain innovative despite downsizing. It is important to point to the specifics of numerical flexibility, more specifically temporary employment, in developing countries. One the one side, temporary employment is more frequently used in developing compared to developed countries. On the other side, it differs substantially in its type (Aleksynska and Berg, 2016). In developed countries, fixed-term contracts are the most prominent form of temporary employment. In developing countries, casual work, defined as the “engagement of workers on an occasional and intermittent basis, for a specific number of hours, days or weeks” (International Labour Organization, 2015, p. 2) is most likely. Casual employment usually involves low-skilled labor as part of the periphery workforce (Aleksynska and Berg, 2016). Consequently, one benefit of temporary employees, namely the intake of specialized and targeted expert knowledge through skilled professionals (Arvanitis, 2005), can hardly be reaped in developing countries and may only be applicable to developed countries.
Despite the low skill levels of temporary workers in the context of our study, employing casual workers is found to mitigate the negative effect of downsizing on innovation. This positive moderation effect could be due to the nature of our dependent variable, process innovation. Casual workers are employed only briefly at one firm, potentially leading to frequent rotation between firms (Aleksynska and Berg, 2016). Therefore, they are able to observe different processes to accomplish potentially similar routine tasks at the various firms they work. The aforementioned frequent rotation can allow casual workers to transport best practices, potentially including different processes, from one firm to another. Casual workers would not as easily be in a position to have this immediate impact on product innovation, which firms frequently have dedicated R&D personnel for (Davenport, 1992). This insight captures the importance of assessing the applicability of existing scholarly knowledge in different regions such as Africa or Asia (George et al., 2016).

The second focus area is the moderating effect of functional flexibility. Our results suggest training allows firms to remain innovative even if they are required to downsize their workforce. It stands out that the percentage of employees, who need to be trained to offset downsizing’s negative effect on innovation, is comparably high. One driver for this high percentage can be the overall low availability of knowledge and human capital in developing countries (van Uden et al., 2017). This also becomes evident in the education levels in the firms participating in our study. Less than half of the employees obtain a secondary school degree. Thus, given the already limited availability of knowledge in firms, the additional knowledge loss associated with downsizing is particularly harmful in the context of developing countries (Fisher and White, 2000). Consequently, as training enables the sharing of knowledge across the firm (Thornhill, 2006), it is especially
important for closing the knowledge gap prompted by downsizing. In this context, training levels as high as 77 percent need to be reached to overcome the challenges for innovation caused by downsizing.

Third, when assessing the impact of wage and reward flexibility (employment bonuses for managers and employees), we find a direct positive effect on process innovation. Contrary to our expectations, it does however not moderate the relationship between downsizing and process innovation. This implies that both in a downsizing and non-downsizing environment, performance bonuses increase a firm’s innovation level. This insight is intriguing as scholars frequently doubt whether “existing management practices can and will work in emerging markets” (de Waal, 2007, p. 70). We see two primary reasons for the direct positive effect of wage and reward flexibility on innovation in the developing countries in Africa and South Asia participating in our study. First, “employers in developing countries point to a high rate of labor turnover as an important obstacle” (Schaffner, 2001, p. 511). Innovation largely depends on skilled workers and their firm-specific knowledge in the core of the firm (Martínez-Sánchez et al., 2009). Therefore, the high rate of turnover, which is considerably higher in developing compared to developed countries (Schaffner, 2001), poses a challenge for the innovativeness of firms. A recent study in India finds that, through the prospect of future monetary incentives, wage and reward flexibility can be a means for motivating employees to remain with a firm (Shahin, 2014). Thus, one explanation for the positive effect of wage and reward flexibility independent of whether or not a firm engages in downsizing, is its ability to reduce undesired turnover. It is however important to keep in mind that living in poverty shortens one’s time perspective. This results in the tendency of employees to appreciate immediate
lower payouts more than future higher payouts (Lawrance, 1991). Therefore, wage and reward flexibility should encourage employees to remain with the firm long enough to benefit innovation on the one side. On the other side, the bonus pay-out should not be too distant for them to forego this future financial reward for potentially higher current pay in another firm (Haushofer and Fehr, 2014). Second, our focus on process innovation in small firms can explain the direct effect of wage and reward flexibility. If their personal bonus payout is tied to the output reached, employees may be inclined to look for an optimal process that allows them to be as efficient as possible in achieving the desired target. Especially in small firms, processes are not necessarily rigidly defined (Zanello et al., 2016). Employees are therefore expected to have considerable influence on how they perform a certain process. Hence, wage and reward flexibility such as tying financial rewards to performance outputs can be a means to fuel process innovation.

We previously elaborated on the various conceptualizations of downsizing and we accounted for its complexity by including control variables on reorganization as well as financial pressure. Our findings support the observation that embedding downsizing in an overall reorganization strategy as well as accompanying it with the adjustment of organizational structures is beneficial for innovation (Chadwick et al., 2004). Simultaneously engaging in downscoping, namely outsourcing non-core business fields as part of a strategic decision to strengthen a firms’ core (Dranikoff et al., 2002) benefits process innovation in our study. This positive effect also holds for insourcing as well for creating new units. Moreover, our results suggest that process innovation suffers less from downsizing if firms experience financial pressure. One reason for this finding could be that employees can better accept the urgency and need to downsize if a firm faces financial
pressure. This acceptance may be lower when firms let go off employees for strategic reasons without the directly visible threat of financial failure. As a consequence of financial pressure, employees may feel higher levels of organizational justice and may feel less inclined to exhibit destructive behaviors (Spreitzer and Mishra, 2002) hampering innovation. The above outlined insights refine our measurement of downsizing. Furthermore, they illustrate that the context and form, in which downsizing occurs, is highly relevant for the impact it has on process innovation.

Despite the contributions of this study, several limitations need to be brought to attention. The data we are using is standardized across many countries and it covers a highly diverse set of firms. Therefore, questions are at times not as detailed as desirable. It would, for example, be interesting to assess the exact form of temporary employment as well as the education level of the temporary employees in more detail in future studies. Furthermore, despite being able to control for endogeneity, it would be intriguing to use data including a more substantial time lag for additional research. Given the particularities of process innovation in SMEs conducted in developing countries, follow-up exploration could assess whether the effects we found in our study also apply to big corporations in developed countries.

CONCLUSION

Overall, based on the importance of innovation for firms in developing countries (Zanello et al., 2016) and their frequent practice of downsizing (The World Bank, 2018), this study empirically investigates the impact of the latter on the former. We find a significant negative effect of downsizing on process innovation. Moreover, our research provides one possible solution for firms to remain innovative despite downsizing. We
identify labor flexibility, more specifically numerical as well as wage and reward flexibility, to mitigate the negative effects of downsizing on innovation. We thus provide managers and policy makers alike with insights on how downsizing affects innovation as well as on how to overcome therewith associated innovation challenges.
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### Table 1. Descriptive Statistics and Correlation Matrix (n=3,085)

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<th>5</th>
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TABLE 2. Poisson Regression Model: Effect of Downsizing and the Interaction Effects between Downsizing and Labor Flexibility on Innovation (n=2,988)

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<td>-1.07***</td>
<td>(0.25)</td>
<td>-1.06***</td>
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<td>Kenya (Country)</td>
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<td>-0.26</td>
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<td>-0.26</td>
<td>(0.17)</td>
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<td>(0.18)</td>
<td>-0.40*</td>
<td>(0.18)</td>
<td>-0.40*</td>
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<tr>
<td>India (Country)</td>
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<td>(0.14)</td>
<td>0.36***</td>
<td>(0.14)</td>
<td>0.37**</td>
<td>(0.14)</td>
</tr>
<tr>
<td>Firm Size</td>
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<td>0.00</td>
<td>(0.00)</td>
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</tr>
<tr>
<td>R&amp;D</td>
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<td>(0.30)</td>
<td>0.18***</td>
<td>(0.30)</td>
<td>0.18***</td>
<td>(0.03)</td>
</tr>
<tr>
<td>Firm Type</td>
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<td>(0.30)</td>
<td>0.09**</td>
<td>(0.03)</td>
<td>0.08**</td>
<td>(0.03)</td>
</tr>
<tr>
<td>Education</td>
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<td>(0.00)</td>
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<td>(0.00)</td>
<td>0.00</td>
<td>(0.00)</td>
</tr>
<tr>
<td>Technologizing</td>
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<td>(0.00)</td>
<td>-0.00</td>
<td>(0.00)</td>
<td>-0.00</td>
<td>(0.00)</td>
</tr>
<tr>
<td>Export</td>
<td>0.08**</td>
<td>(0.03)</td>
<td>0.08**</td>
<td>(0.03)</td>
<td>0.08**</td>
<td>(0.07)</td>
</tr>
<tr>
<td>Insourcing</td>
<td>0.18***</td>
<td>(0.03)</td>
<td>0.16***</td>
<td>(0.03)</td>
<td>0.16***</td>
<td>(0.03)</td>
</tr>
<tr>
<td>Outsourcing</td>
<td>0.06</td>
<td>(0.03)</td>
<td>0.07*</td>
<td>(0.03)</td>
<td>0.07*</td>
<td>(0.03)</td>
</tr>
<tr>
<td>Reorganization - New Unit</td>
<td>0.12***</td>
<td>(0.03)</td>
<td>0.13***</td>
<td>(0.03)</td>
<td>0.13***</td>
<td>(0.03)</td>
</tr>
<tr>
<td>Reorganization - Merged Units</td>
<td>0.01</td>
<td>(0.05)</td>
<td>0.04</td>
<td>(0.05)</td>
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<td>(0.05)</td>
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<tr>
<td>Financial Performance</td>
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<td>(0.00)</td>
<td>-0.00***</td>
<td>(0.00)</td>
<td>-0.00***</td>
<td>(0.00)</td>
</tr>
</tbody>
</table>

Direct effects of Downsizing and Labour Flexibility

- Downsizing: -0.16* (0.07) -0.41** (0.15)
- NF - Temporary: 0.00* (0.00) 0.00 (0.00)
- FF - Training (%): 0.00 (0.00) 0.00 (0.00)
- WR Flexibility - Employment Bonus: 0.17*** (0.03) 0.17*** (0.03)

Interactions

- Downsizing X Temporary: 0.01*** (0.00)
- Employment
- Downsizing X Training: 0.00* (0.00)
- Downsizing X Bonus: 0.07 (0.14)
- Constant: -0.03 (0.14) -0.18 (0.15) -0.19 (0.15)

LR Chi2: 39.98 49.40 9.42
Prob>chi2: 0.00 0.00 0.02

* p < 0.05, ** p < 0.01, *** p < 0.001
### TABLE 4. Endogeneity Test for Downsizing and Innovation

<table>
<thead>
<tr>
<th>Variables</th>
<th>Model 6 Propensity Score Matching (6 nearest neighbors)</th>
<th>Model 7 Inverse-probability weighted regression-adjustment</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>B</td>
<td>SE</td>
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<td>Downsizing</td>
<td>-0.17*a,b</td>
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<tr>
<td>Country matched</td>
<td>-0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>R&amp;D matched</td>
<td>0.34***</td>
<td>0.05</td>
</tr>
<tr>
<td>Firm Type matched</td>
<td>0.30***</td>
<td>0.05</td>
</tr>
<tr>
<td>Export matched</td>
<td>0.03</td>
<td>0.05</td>
</tr>
<tr>
<td>Insourcing matched</td>
<td>0.29***</td>
<td>0.05</td>
</tr>
<tr>
<td>Outsourcing matched</td>
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<td>0.06</td>
</tr>
<tr>
<td>Reorganization - New Unit matched</td>
<td>0.28***</td>
<td>0.05</td>
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<tr>
<td>Financial Performance matched</td>
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<td>0.00</td>
</tr>
<tr>
<td>Constant n/a</td>
<td>1.29***</td>
<td>0.07</td>
</tr>
</tbody>
</table>

| N                 | 3,402      | 3,402   |
| Model Significance| 0.045      | 0.021   |
| Year fixed effects| Yes        | Yes     |

*a* included are only control variables, which are significant in Poisson Regression  
*b* reported coefficient is the average treatment effect in the population  
*c* reported coefficients are the regression adjusted coefficients for the ‘untreated’ group  
* p < 0.05, ** p < 0.01, *** p < 0.001
FIGURE 1. Predictive Margins of Downsizing on Innovation
FIGURE 2. Predictive Margins of Downsizing with Numerical Flexibility
FIGURE 3. Predictive Margins of Downsizing with Functional Flexibility
FIGURE 4. Predictive Margins of Wage and Reward Flexibility on Innovation
**APPENDIX 1.** Decrease in Employee Number for Different Forms of Organizational Change

<table>
<thead>
<tr>
<th>Percentage of Firms with Decrease in overall Employee Number</th>
<th>Organizational Change: Creating a New Unit</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>5.46</td>
</tr>
<tr>
<td></td>
<td>7.16</td>
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<tr>
<td></td>
<td>8.53</td>
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