Success Belongs to the Flexible Firm

Ritter-Hayashi, D.; Knoben, Joris; Vermeulen, P.A.M.

Success belongs to the Flexible Firm: How Labor Flexibility Can Retain Firm Innovativeness in Times of Downsizing

Daniela Ritter-Hayashi[1,2]

D.RitterHayashi@fm.ru.nl

Joris Knoben[2]

J.Knoben@fm.ru.nl

Patrick Vermeulen[2]

P.Vermeulen@fm.ru.nl

This research was funded with support from the Department for International Development (DFID) in the framework of the research project 'Enabling Innovation and Productivity Growth in Low Income Countries' (EIP-LIC/PO5639). Website: https://www.tilburguniversity.edu/dfid-innovation-and-growth/

[1] Corresponding author

[2] Radboud University, Institute for Management Research, P.O. Box 9108, 6500 HK Nijmegen, The Netherlands

Abstract

THEORY AND HYPOTHESIS

Innovation is key – not only for highly technologically advanced firms in developed countries but also for small firms in emerging nations (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, p. 4). 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 that it must 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, p. 49).

Innovation frequently suffers from downsizing (Hansson & Gandolfi, 2015), but for the below outlined three non-mutually exclusive reasons, firms nevertheless commonly engage in downsizing: First, according to the economic perspective on downsizing, firms rationalize downsizing as a means to cut cost and with that to improve a firm's financial performance (McKinley et al., 2000). Second, as summarized in the industrial organization thesis, downsizing is often utilized in situations of low labor productivity, industry decline or a highly competitive environment (Kawai, 2015). Third, the cognitive reorientation towards perceiving downsizing as a way to be flexible and competitive increasingly validates downsizing as a suitable management practice (McKinley et al., 2000) to align strategy and resources (Agwu, Carter, & Murray, 2014).

Regardless of the above outlined reasons for downsizing and in spite of the few therewith associated short-term financial benefits (Yu & Park, 2006), the medium and long-term effect of downsizing is widely suggested to be negative. This entails a firm's financial performance as well as employee reactions (Kawai, 2015; Marques et al., 2014) and, more importantly for our study, its innovation capability. Based on a quantitative study in the US, Dougherty and Bowman (1995) suggest downsizing to reduce innovation as it "breaks the network of information relationships used by innovators". On similar terms, Amabile and Conti (1999) examined the work environment for creativity before, during and after major downsizing activities. The authors find a significant decline in creativity-supporting aspects in the perceived work environment during downsizing, with a modest increase later on.

Notwithstanding the previously elaborated on insights and "despite its importance, our understanding of the association between downsizing and innovation is very limited" (Mellahi & Wilkinson, 2010, p. 2292). No study to date has, to our knowledge, assessed whether the negative effects of downsizing on innovation in developed countries also extend to process innovation in developing countries. Given the importance of innovation for the economic growth and development of emerging countries (Zanello et al., 2016) and the use of downsizing as a management practice in the countries participating in our study (The World Bank, 2016), we deem a better understanding of the latter on the former to be critical for policy makers and managers alike. Given the special importance of internal networks for process innovation (Davenport, 1992) and their damage in the course of downsizing (Dougherty & Bowman, 1995), not only the research focus on small and medium enterprises in developing countries, but also the attention to process innovation is

highly intriguing in this context. We expect downsizing to negatively impact process innovation in developing countries and hence hypothesize the following.

> *Hypothesis 1:* Firms that employ a downsizing strategy exhibit less process innovation compared to firms that do not downsize their workforce.

Besides shedding light on the relationship between downsizing and process innovation, we furthermore propose that labor flexibility mechanisms can be a way for firms to remain innovative in a downsizing environment. Before developing the hypotheses on these moderation effects, we briefly elaborate on the labor flexibility model. Previous research finds the impact of downsizing to be contingent on the organizational context in which it occurs: organizational slack and a proactive response to downsizing (Love & Nohria, 2005), the speed and severity of downsizing (Mellahi & Wilkinson, 2008), understanding both the formal as well as informal networks in the organization (Aalbers & Dolfsma, 2014), manager's trustworthiness and perceived organizational justice (Spreitzer & 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 effect downsizing has on a firm and more specifically, on its innovative performance.

Labor flexibility, such as numerical, functional as well as wage and reward flexibility, is found to have a considerable impact on a firm's ability to adjust to change and to drive innovation (Arvanitis, 2005) by contributing to a "firm's ability to quickly reconfigure resources and activities in response to environmental demands" (Wright & Snell, 1998, p. 758). We propose that labor flexibility can be a means for firms to adapt to downsizing as a

very drastic form of change. In line with this proposition, we suggest that the three different forms of labor flexibility help to mitigate three different innovation risks brought about by downsizing. We elaborate on the three anticipated interaction effects in the following sections.

Organizational downsizing, numerical flexibility and innovation

We expect numerical flexibility, referring to a firm's ability to adapt the number of employees by making use of non-standard working arrangements such as temporary employment (Michie & Sheehan, 2005), to limit the detrimental effects of downsizing on innovation. 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, Vela-Jiménez, Pérez-Pérez, & Luis-Carnicer, 2009). On the one hand, scholars point to the risks of numerical flexibility for innovation (Beugelsdijk, 2008; Michie & Sheehan, 2005) given the longevity in employees' capabilities (Barney, 1991) and the path dependency of innovation (Pavitt, 1991). On the other hand, researchers propose numerical flexibility to benefit innovation (Kok & Ligthart, 2014) as it can provide the firm with required external specialized knowledge (Barney, 1999) and fresh ideas (Wachsen & 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 innovation. Two streams of thought lead us to this assumption:

First, employing temporary employees and with that shielding permanent employees from turbulences in a firm's environment (Aleksynska & Berg, 2016), increases employment security among permanent employees (van Riemsdijk & de Leede, 2001).

Given the inherently high levels of insecurity and instability in times of downsizing (Guthrie & Datta, 2008), this upsurge in security associated with employing temporary employees is essential for several reasons: employment security is a critical part of permanent employees' psychological contract (Rousseau, 2004). Fulfilling perceived obligations, such as employment security, is found to boost employees' commitment (Parzefall & Hakanen, 2010), which is an essential prerequisite for innovation (Marques et al., 2014). Furthermore, up-levelling employment security decreases the perceived need of permanent employees to "protect their job - to justify themselves by looking good" (Amabile & Conti, 1999, p. 635); a behavior, which does not allow them to focus on the job itself and limits them in their creativity (Amabile & Conti, 1999). 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.

Second, when focusing on the remaining temporary employees, the impact of downsizing and the therewith associated increase in employment instability (Guthrie & Datta, 2008) is expected to be negligible: Given that the employment relationship between a firm and its temporary employees does not necessarily entail long-term employment security (Rousseau, 2004), downsizing does not automatically relate to a breach of temporary employees' psychological contract (De Cuyper & De Witte, 2006). These insights are supported by a recent study suggesting that the negative impact of a downsizing announcement on firm performance diminishes with an increasing share of temporary employees (Friebel, Heinz, & Zubanov, 2016). Consequently, we expect numerical flexibility to buffer the detrimental effect of downsizing on innovation.

We consider the afore discussed continued commitment among permanent and temporary employees during downsizing to be specifically relevant for process innovation in SMEs. As, especially in SMEs, fewer resources are available for process compared to product innovation (Fritsch & Meschede, 2001), process innovation depends on a large degree on employees' commitment and motivation, which tend to decrease in the course of downsizing (Arshad & Sparrow, 2010). Given the previously outlined innovation-related benefits of employing temporary employees, including commitment enhancement, we propose that numerical flexibility can be a means to soothe the negative effect of downsizing on process innovation.

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

Organizational downsizing, functional flexibility and innovation

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

In addition and more specifically in the context of downsizing, providing the remaining employees with training is suggested to be pivotal for firms to recover from post-downsizing effects (Hansson & Gandolfi, 2015) for two reasons: First, the considerable loss of firm-specific knowledge associated with downsizing (Fisher & White, 2000) is highly challenging for firms as successful "innovation depends on knowledge" (Roper & Hewitt-Dundas, 2015, p. 1327). Training is an important mechanisms to inspire internal flows and distribution of knowledge across the remaining firm members and it thus enables both the reconfiguration of existing knowledge (Thornhill, 2006) as well as the creation of new understandings (Kim & Sung-Choon, 2013). Hence, by buffering the knowledge loss in the course of downsizing, functional flexibility is expected to sooth its negative effect on innovation.

Second, if employees perceive the original expectation of employment security and stability to not be credible in the context of high uncertainty accompanying downsizing, their focus shifts from employment security to employability (Chadwick et al., 2004). Thus, the "development of employability implies the foundation of a new form of social or psychological contract between employers and employees" (Arocena, Núñez, & Villanueva, 2007, p. 193). Employability at the individual level of analysis generally refers to the capacity and willingness of an employee to remain attractive in the labor market (Carbery & Garavan, 2005) and to 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 an employability (Carbery & Garavan, 2005). As a consequence, we expect

functional flexibility to buffer the negative effect of downsizing on innovation through establishing an alternative form of psychological contract centered around employability.

In sum and as outlined above, training can on the one side serve as a step stone for overcoming the knowledge gap (Thornhill, 2006) caused by downsizing (Fisher & White, 2000) and it can on the other side be an important component for employees to establish a new form of psychological contract with the firm centered around employability (Arocena et al., 2007). Bridging the knowledge gap stemming from downsizing is especially important for process innovation, as process innovation in particular requires the knowledge and input of different functions within the firm. Their knowledge of the existing processes as well as understanding of the newly introduced procedures is vital for the success of process innovation (Boer & 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. Consequently, we hypothesize the following.

> *Hypothesis 3:* 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 decreases 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, while being able to respond to labor market conditions (Michie & Sheehan, 2005). Wage and reward flexibility specifies the rewards employees can assume to receive in

response to their performance and aims directly at influencing the motivation, behavior and actions of employees (Ederer & 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 & Manso, 2013).

Given its impact on motivation, wage and reward flexibility can play a particularly important role for innovation, especially in a downsizing environment: Downsizing is frequently found to decrease motivation levels of employees as well as their commitment and work efforts (Marques et al., 2014). More specifically, according to the affective events theory (Weiss & Cropanzano, 1996), a negative event in the workplace, such as downsizing, prompts negative emotional reactions, which in turn lead to a decrease of intrinsic work motivation over time. Low morale and motivation can, however, be regarded upon as major obstacles to innovation (Mellahi & Wilkinson, 2008).

A recent case study by Arshad and colleagues (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. Moreover, given the considerable changes brought about by downsizing, wage and reward flexibility is a vital mechanism for "motivating employees to alter their attitudes and behaviors in a manner that is required" (Kim & 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).

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 & During, 2001). Downsizing, however, creates an environment of uncertainty, in which employees are found to be highly resentful and resistant to change (Amabile & 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 and propose the following.

> ***Hypothesis 4:*** *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, Demirgüc-Kunt, & Maksimovic, 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, p. 895), which has been increasingly used in current studies on innovation in emerging nations (Barasa, Knoben, Vermeulen, Kimuyu, & Kinyanjui, 2017; Pezeshkan, Smith, Fainshmidt, & Amini Sedeh, 2016; Wang & Libaers, 2016).

The ES is a standardized firm-level survey representing an economy's private sector in the manufacturing, retail and service industry. The focus of this research is the manufacturing industry, a choice which is driven by the following reasons: first, the manufacturing industry survey provides additional critical insights on labor flexibility (moderator) compared to the service industry survey. Second, process innovation has been previously established to differ between the manufacturing and the service industry (Hipp & Grupp, 2005). To ensure homogeneity with regards to characteristics of process innovation and given that manufacturing firms represent the majority of the firms participating in the countries outlined above, we thus focus on process innovation the manufacturing industry.

The ES is stratified based on firm size, geographical location and industry sector. It covers firm characteristics, the business environment a firm is operating in as well as information on innovation activities. The IFS specifically focuses on innovation and innovation-related activities within firms. IFS respondents are a randomly selected subset representing 75 percent of the firms which have been already interviewed in the standard ES to gather in-depth insights on innovation (The World Bank, 2011). To enrich the data base for this study, the datasets of the ES and IFS are merged through the country-specific unique firm identifier.

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: it is coded zero, if none of the above listed questions are answered positively, it is coded one if one of the questions is answered affirmatively, it is coded two if two of the process innovation related questions are replied to with "yes" and it is coded three if all three questions are answered positively. If the reply to all three questions is "Don't know", the combined process innovation measure is coded as missing. In case the respondent does not know the answer for one or two questions, the combined measure represents the insights into the remaining answer(s).

Predictor Variable: Organizational Downsizing

We assess organizational downsizing by whether or not a firm made "any changes in its organizational structure" in a sense of whether it did "Dissolve any units or department". Firms having dissolved units are coded one, whereas firms not having dissolved units are coded zero. Even though this measurement does not necessarily capture an increase or decrease of the overall employee number over time, an alternative measure of downsizing (Chadwick et al., 2004), it appears to be the most appropriate way of determining downsizing in the context of our study: when cross-tabulating different forms of organizational change such as creating a new unit, merging existing units or dissolving units on the one hand with a decrease in total employee numbers on the other hand it stands out that the percentage of firms with a decrease in their overall employee numbers only differ by a maximum of 3 percent across the three different forms of organizational change.

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), which may not automatically lead to an overall reduction in the employee numbers (Burgess, Lane, & Stevens, 2001). Thus, measuring downsizing by the dissolving of a unit seems to be a more appropriate choice than focusing on the development of employee numbers (aggregated over business units) over time.

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, captured by the combination of two ES questions on how "many full-time temporary employees did this establishment employ" and "how many permanent, full-time individuals worked in this establishment". This measurement, which ensures comparability across firms, is in line with previous research (Martínez-Sánchez et al., 2009). In the ES, temporary workers are defined relatively broadly by capturing any type of temporary workers that are employed with a firm less than one year without the promise of contract renewal on the one side and relatively narrow by only including full-time employees on the other side (Aleksynska & Berg, 2016).

Functional flexibility: training. Functional flexibility is measured by the percentage of employees having received formal training, 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?". The latter question is both asked for production and non-production employees. A combined indicator in a sense of the average training percentage of production and non-production workers is calculated if the respondents indicated in the first question, that formal training programs have been offered in the firm. Otherwise, the average percentage is set to zero. Measuring functional flexibility through training is in line with previous conceptualizations (Kok & 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 in this study through dummy variables. This approach is in line with previous studies on innovation in developing countries (Barasa et al., 2017).

Firm Size. Accounting for the enhanced access of large organizations to finance and economies of scale (Michie & 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 & 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. As education has been found to be vital for innovation (Arvanitis, 2005; De Cuyper & De Witte, 2006; Kok & Ligthart, 2014), we control for the education level of employees, captured in the ES by the "percentage of full-time permanent workers who completed secondary school".

Technologizing. Based on the positive impact technology input has on innovation (Arvanitis, 2005), we furthermore 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 & 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/ Insourcing. As outsourcing has been previously found to significantly impact innovation (Martínez-Sánchez et al., 2009), a firm's practice with regards to outsourcing is accounted for in the IFS by whether establishments "contract other firms to perform any activities previously done in-house". Firms answering negatively to this question are coded zero while firms giving an affirmative reply are coded one. 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.

Reorganization. Reorganization in a sense of structural recombination refers to both creating new units within a firm as well as merging existing units, which has been previously found to impact innovation (Karim & 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.

Financial Performance. As previously elaborated on, firms downsize for a wide range of reasons, including both strategic reasons such as the alignment of resources and strategic direction (Agwu et al., 2014) on the one side as well as direct financial pressure on the other side (McKinley et al., 2000). As a proxy for a firm's reason to downsize, we control for the percentage of a firm's working capital which was financed by "internal funds or retained earnings" versus which was borrowed from a third party (ES). We expect a low percentage of the former to be related to experiencing financial pressure to downsize.

Statistical Analysis

We used a Poisson Regression Model to estimate the effects of our independent as well as moderating variables on our dependent variable. The choice of this model was governed by the characteristics of the dependent variable, namely a count variable. To capture the previously mentioned moderating effect of labor flexibility, we encompassed interaction effects between downsizing and the three forms of labor flexibility in the analysis. A frequent challenge arising from including interaction effects is multicollinearity (Afshartous & Preston, 2011), which we tested for 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. All models were estimated using robust standard errors.

RESULTS

Table 1 presents the descriptive statistics and pairwise correlations between all variables of this study, providing the following interesting insights: the vast majority (84.74 percent) of the firms participating in our study are small and medium enterprises (SMEs), in which the negative impact of downsizing can be expected to be more prominent due to reasons of proximity (Torres, 2011). The majority of the businesses are individual establishments (75.87 percent), primarily generating sales from national transactions (67.88 percent). Furthermore, 38.83 percent of the firms, whose average percentage of employees with a secondary school degree accounts for 47.14, engage in R&D. For our study, it is additionally insightful that the participating firms engage in various forms and degrees of organizational restructuring: 34.76 percent have created a new unit and 11.53

percent have merged existing units. Furthermore, 24.89 percent have insourced previously externally conducted activities and 21.71 percent have outsourced previously inhouse accomplished tasks. When focusing specifically on downsizing, our independent variable, 7.79 percent of all firms participating in our study have dissolved an existing unit.

Besides, it is interesting to shed light on the degree to which firms make use of different forms of labor flexibility. We observe that wage and reward flexibility is most widely employed in the firms participating in our study, with more than half of the firms providing performance bonuses to their employees and managers (57.66 percent). Second most frequently used is functional flexibility with 44.54 percent of the enterprises in our research offering training to their employees followed by numerical flexibility with 37.41 percent respectively employing temporary employees.

Finally, the dependent variable, process innovation, indicates that 68.42 percent of the firms participating in this study introduced (a) new or significantly improved process(es). More specifically, 19.66 percent of the firms introduced one type of process innovation, 19.03 percent two types and 29.73 percent three types.

Insert Table 1 about here

We test our hypotheses by estimating a Poisson Regression using 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 as the 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.

Insert Table 2 about here

Model 1 indicates that multiple control variables have a significant effect on process innovation, with the results being well aligned to previous findings and our expectation based on existing scientific insights: First, the country, a firm is operating in, has a significant effect on process innovation, with the effects' direction and strength varying between countries. Moreover, as anticipated (Kok & Ligthart, 2014), engaging in R&D positively affects the level of innovation in a firm, suggesting that investing either in internal or externally contracted R&D is linked to more innovation. Likewise, as predicted based on similar previous results (Beugelsdijk, 2008), establishments, which are part of a larger firm, are found to have higher levels of innovation. Moreover, we observe exporting firms to be more innovative, which is in line with preceding studies (Beugelsdijk, 2008; Mellahi & Wilkinson, 2010). Interestingly, our results suggest that both in- as well as outsourcing yield a positive innovation impact, which is not per se a contradiction: Firms are considered to consists of both a core, which is highly critical for innovation, as well as a periphery with lower importance for innovation (Martínez-Sánchez et al., 2009). If outsourcing strategies are thus located in the periphery of the firm whereas insourced activities are part of a firm's core, our study suggests both forms to ultimately benefit innovation. Finally, our results propose that creating a new organizational unit as one form of structural recombination positively impacts innovation.

Model 2 illustrates that our independent variable, downsizing, has a significant negative effect on process innovation. Our results hence suggest that firms, which make use of downsizing, have significantly lower levels of innovation with an effect size of 0.84 standard deviations. This finding is in line with findings from developed countries (Amabile & Conti, 1999; Dougherty & Bowman, 1995) and provides strong support for Hypothesis 1 as illustrated in Figure 1.

Insert Figure 1 about here

Next to the direct negative direct effect of downsizing, the results of Model 2 suggest that wage and reward flexibility has a positive significant direct effect on process innovation, with an effect size of 0.52 SD. This insight proposes that providing performance bonuses to managers and employees directly increases a firm's likelihood for process innovation.

Model 3 assesses the interaction effect between downsizing and the afore discoursed measures of labor flexibility and thus sheds light on the three proposed moderation effects as described in Hypotheses 2 to 4. Whereas there is no significant moderation effect for wage and reward flexibility (Hypothesis 4), both numerical (Hypothesis 2) and functional flexibility (Hypothesis 3) have a positive and statistically significant moderation effect. Consequently, to a large extent, the results sustain our hypotheses that different forms of labor flexibility can be a means to sooth the negative effect downsizing has on innovation.

Hypothesis 2 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, portraying that the impact of downsizing on innovation differs contingent on the percentage of temporary employees. At 0 percent temporary employment, thus when a firm's workforce consists solely of permanent employees, downsizing negatively impacts the 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 at 31 percent temporary employees among the workforce. Moreover, the graph illustrates that the positive effect numerical flexibility has on a firm's innovation level is much more prevalent for firms undergoing downsizing (15.62 SD) compared to firms not undergoing downsizing (1.84SD), whereby the high effect sizes are explained by capturing the full range between employing 0 percent to 96 percent temporary employees. Overall, the results suggest a significant positive moderation effect of numerical flexibility, proposing that an increasing percentage of temporary employees among the workforce can mitigate the negative impact of downsizing on firms' innovation levels. Thus, the results offer strong support for Hypothesis 2.

Insert Figure 2 about here

Hypothesis 3 is supported in that functional flexibility, the percentage of employees trained, moderates the relation between downsizing and a firm's innovation level, as graphically displayed in Figure 3. In line with expectations, the impact downsizing has on innovation differs with varying percentages of the workforce having received training. We observe that when firms do not offer training to their employees, corresponding to 0

percent of the employees being trained, downsizing negatively impacts the firm's innovation level with an effect size of 1.63 SD. Increasing percentages of employees being trained mitigate the negative effect downsizing has on innovation. The threshold, at which firms with and without downsizing have an equal innovation level is reached when 77 percent of the workforce are trained. Furthermore, Figure 3 exemplifies that the positive impact of training on a firm's innovation level is much higher for firms undergoing downsizing (effect size 2.40 SD) compared to firms not undergoing downsizing (effect size 0.30 SD), whereby the effect size covers the full range from offering training to a minimum of 0 percent to a maximum of 100 percent of the employees respectively. Essentially, we observe a sizeable positive effect of the interaction between downsizing and functional flexibility on innovation, indicating that training allows firms to sooth the negative effect downsizing has on innovation levels within the firm. The results consequently offer support for Hypothesis 3.

Insert Figure 3 about here

Hypothesis 4 is not supported by the results of this study given that there is insufficient evidence at the 5 percent significance level to reject the proposal that wage and reward flexibility has no effect on the relationship between downsizing and and a firm's innovation level. Figure 4 illustrates that, independent of the 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. In a downsizing environment, the effect size of offering wage and reward flexibility accounts for 0.43 SD, in firms not undergoing downsizing for 0.50 SD.

Insert Figure 4 about here

Robustness tests

Sensitivity of Results. We performed multiple robustness checks to assess our results' sensitivity to changes in estimation methods. Given that our dependent variable is a count variable of categories with a rather limited range (0-3) we use two alternative model specifications that could also be argued to be applicable to such a data structure, namely Negative Binominal Regressions (Model 4) and Ordered Logistic Regressions (Model 5). The robustness test of Model 4 indicates that our main results are not sensitive to analyzing the data with this alternative method, namely a Negative Binominal Regressions: confirming Hypothesis 1, downsizing continues to have a significant negative effect on process innovation. Similarly, the direct effect of wage and reward flexibility remains significantly positive. Furthermore, the moderation effect of numerical flexibility as well as functional flexibility are continuously positive and significant, supporting Hypothesis 2 and 3 respectively. Model 5 assesses the robustness of our results by the means of an Ordered Logistic Regression. In line with the results of our main analysis and Model 4, we find a significant direct negative effect of downsizing on innovation (Hypothesis 1) as well as a direct positive effect of wage and reward flexibility. Correspondingly, numerical flexibility is confirmed to moderate the relationship between downsizing and innovation, as specified in Hypothesis 2. In contrast, the moderating effect functional flexibility is insignificant. Overall, given the congruence of the results across the various model specifications, the robustness checks conducted strengthen the confidence in our results.

Insert Table 3 about here

Possible Endogeneity. Except for insights on the percentage of temporary employees and the percentage on employees trained, our analyses rely on cross-sectional data, allowing for no 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). To account for the challenge of "over-parameterized models" (Caliendo & Kopeinig, 2008, p. 38), we only include significant variables in the propensity score specification. Both propensity score estimations aim at excerpting treatment effects from observational data (Guo & Fraser, 2015), whereby downsizing can be referred to as the treatment in our analysis.

In Model 6, a firm undergoing downsizing is matched to other firms (six) with high resemblance on the covariates, which however do not receive the treatment, namely do not undergo downsizing. A comparison of the matched cases reveals a sizeable and statistically significant effect of downsizing. In Model 7 we furthermore account for the fact that some covariates such as the working capital available to a firm can influence both the likelihood of receiving the treatment (i.e. self-selection into downsizing as a strategic choice) as well as the level of innovation. The inverse probability weighted regression adjustment estimators both model the treatment as well as the outcome to account for the nonrandom assignment of treatment. Similar to the results of Model 6, the effect of downsizing in Model 7 is sizeable and statistically significant. Taking the findings of Model 6 and 7, which deal with endogeneity concerns, into consideration further strengthens our

confidence in the conclusions on the relationship between downsizing and innovation we draw.

Insert Table 4 about here

DISCUSSION

The results of this research point to two important insights, which are new to the existing scholarly knowledge as to date. Our results suggest that downsizing a firm's workforce negatively impacts process innovation in SMEs in emerging nations, not only as thus far proposed product innovation in developed countries. Moreover, our study puts forward that labor flexibility can be a way for firms to overcome the innovation challenges associated with downsizing: We find that both numerical flexibility, namely the use of temporary employment, as well as functional flexibility such as employee training, can alleviate the negative impact of downsizing on innovation. Moreover, independent of whether or not a firm is downsizing its workforce, wage and reward flexibity in terms of performance bonuses for managers and employees positively impacts innovation.

Given the importance of innovation for the economic development of emerging nations (Zanello et al., 2016), the newly aquired insight that downsizing has a detrimental effect on innovation in developing countries in South Asia and Africa is highly relevant for policy makers and managers in the region.

When shedding more light on labor flexibility as a mechanism for overcoming the above mentioned innovation hurdle associated with downsizing in general and when assessing the importance of numerical flexiblity in specific in a first step, two elements are

most relevant to discuss: On the one side, it is critical to point to the contextual factor of our study being located in the context of emerging nations. Next to temporary employment being more frequently used in developing compared to developed countries, it also differs substantially in its type (Aleksynska & Berg, 2016). Fixed-term contracts are the most prominent form of temporary employment in developed countries, whereas 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 more likely in emerging nations. Casual employment usually involves low-skilled labor as part of the periphery workforce (Aleksynska & Berg, 2016). Consequently, one benefit of temporary employees, namely the intake of specialized and targeted expert knowledge through skilled professionals (Arvanitis, 2005) can be hardly reaped in emerging nations and may only be applicable to developed countries.

On the other side, despite the overall very low skill level of casual workers, we find innovation to benefit from numerical flexibility in the specific context of downsizing. Our results suggest that firms with a share of more than 31 percent temporary employees can offset the negative effect downsizing has on innovation. At this cut-off point, there is no difference between firms both undergoing and not undergoing downsizing. These findings are in line with the previously elaborated on benefit of temporary employment for innovation in times of downsizing through its ability of signalling employment security to permanent employees (van Riemsdijk & de Leede, 2001) as part of their psychological contract (Rousseau, 2004).

A further explanation for the positive moderation effect despite low skill levels of temporary workers could be grounded in the type of innovation and the context we are

focusing on in this study. As casual workers are employed only briefly at one firm, we expect them to frequently rotate and with that to observe different processes to accomplish potentially similar routine tasks at the various firms they work at. The aforementioned frequent rotation allows casual workers to transport best practices, potentially including different processes, from one firm to another. We suppose that 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 our study focusing on process rather than prodcut innovation as well as of assessing the applicability of existing scholarly knowledge in different regions such as Africa or Asia (George et al., 2016).

Second, our results suggest functional flexibility, an increasing percentage of employees having received training, to positively moderate the relationship between downsizing and innovation. Despite the overall lower education and thus knowledge levels in firms operating in developing compared to developed countries (Shahin, 2014), the loss of firm-specific knowledge associated with downsizig confronts firms with considerable innovation challenges. Thus, the ability of training to distribute existing knowledge among the remaining firm members (Thornhill, 2006), to create new knowledge (Kim & Sung-Choon, 2013) as well as to increase employees' employability (Carbery & Garavan, 2005) proves to be critical for firms. Moreover, when focusing on the psychological impact downsizing has on the remaining employees, our results support previous findings that employability can be a substitute for employment security during downsizing to shield their psychological contract with the firm (Chadwick et al., 2004). Our findings thus suggest that functional flexibility can be a means for firms to buffer downsizing's negative

effect on innovation. Upon achieving a threshold of 77 percent training coverage among the workforce, downsizing firms do not suffer from lower levels of process innovation compared to firms not downsizing their employee base.

When assessing the likelihood of reaching the numerical and functional flexibility thresholds respectively, the following insights stand out: 37 percent of the firms participating in our study make use of numerical flexibility. Within this group of firms, as much as 57 percent have a percentage surpassing the required threshold of 31 percent temporary employees among the workforce. In comparison, more firms, namely 45 percent of the participating companies, make use functional flexibility. However, among them, only 26 percent train more than the required threshold of 77 percent of the employees to reach the innovation cut-off point between downsizing and non-downsizing firms. The majority of the firms using functional flexibility, namely 74 percent, stay below this threshold. Thus, despite more firms using functional compared to numerical flexibility, achieving the percentage of temporary employees required to surpass the afore outlined threshold seems to be more practicable than surpassing the necessary percentage of employees that received training.

Third, wage and reward flexibility in a sense of employment bonuses for managers and employees has a direct positive effect on innovation. Contrary to our expectations, it does however not moderate the relationship between downsizing and innovation, implying that both in a downsizing and non-downsizing environment, performance bonuses increase a firm's innovation level. The insight into the effectiveness of wage and reward flexibility for a firm's innovativeness in developing countries is intriguing as scholars frequently doubt whether "existing management practices can and will work in emerging markets"

(de Waal, 2007, p. 70). The results of our study propose that providing performance bonuses as a management practice, which is commonly employed in developed countries, is highly efficient in the emergent country context of this study. We see two drivers for the direct positive effect of wage and reward flexibility on innovation, the first being routed in the nature of employment in developing countries, the second being driven by the nature of process versus product innovation. 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 emerging compared to developed countries (Schaffner, 2001), poses a challenge for the innovativeness of firms. Wage and reward flexibility can, if designed accordingly, be a means for motivating employees to remain with the firm given the prospect of monetary incentives, as indicated in a recent study in India by 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 by providing targeted employees critical for a firm's innovative success with financial rewards for remaining with the firm. Second, our focus on process innovation in this study 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 SMEs, which build the majority of the firms in this study and where processes are not necessarily rigidly defined (Zanello et al., 2016), employees are expected to have considerable influence on how they perform a certain process – more so than the influence

they can exert on the development of the overall product. Hence, wage and reward flexibility such as tying financial rewards to performance outputs can be a means to fuel process innovation.

Despite the contributions of this study, several limitations need to be brought to attention. As the data, we are using is standardized across many countries and covers a highly diverse set of firms, questions are at times not as detailed as potentially desirable for this research. It would for example be interesting to assess the exact form of temporary employment as well as 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.

Overall, based on the importance of innovation for developing countries (Zanello et al., 2016), this study empirically investigates the impact of downsizing on process innovation in the predominant form of SMEs in emerging nations and finds a significant negative effect of the former on the latter. Furthermore, our research provides one possible solution for firms to remain innovative in this particularly challenging environment by accounting for the effectiveness of labor flexibility in a downsizing environment. The results indicate that employing numerical and functional flexibility practices have a significant positive moderation effect on the aforementioned relationship and prove to be an effective means for firms to be innovative in times of downsizing.

REFERENCES

Aalbers, R., & Dolfsma, W. 2014. Innovation Despite Reorganization. *Journal of Business Strategy*, 35: 18–25.

Afshartous, D., & Preston, R. A. 2011. Key Results of Interaction Models With Centering. *Journal of Statistics Education*, 19: 1–24.

Agwu, E. M., Carter, A., & Murray, P. J. 2014. Downsizing as a Strategic Tool for Effective Organizational Management: A Case Study of Nigerian Banks. *International Journal of Research in Management, Science & Technology*, 2: 1–9.

Aleksynska, M., & Berg, J. 2016. *Firms' demand for temporary labour in developing countries: Necessity or strategy?* Geneva.

Amabile, T. M., & Conti, R. 1999. Changes in the Work Environment for Creativity during Downsizing. *The Academy of Management Journal*, 42: 630–640.

Arocena, P., Núñez, I., & Villanueva, M. 2007. The effect of enhancing workers' employability on small and medium enterprises: Evidence from Spain. *Small Business Economics*, 29: 191–201.

Arshad, M. A., Mahmood, A., Akhtar, S., & Ahmed, A. 2016. Overcoming Resistance of Downsizing: A Case Study of Ledzworld Technology Company in Malaysia. *i-manager's Journal on Management*, 10: 29–35.

Arshad, R., & Sparrow, P. R. 2010. Downsizing and survivor reactions in Malaysia: modelling antedecents and outcomes of psychological contract violation. *International Journal of Human Resources Management*, 21: 1793–1815.

Arvanitis, S. 2005. Modes of labor flexibility at firm level: Are there any implications for performance and innovation? Evidence for the Swiss economy. *Industrial and Corporate Change*, 14: 993–1016.

Ayyagari, M., Demirgüc-Kunt, A., & Maksimovic, V. 2011. Firm Innovation in Emerging Markets: The Role of Finance, Governance, and Competition. *Journal of Financial and Quantitative Analysis*, 46: 1545–1580.

Barasa, L., Knoben, J., Vermeulen, P., Kimuyu, P., & Kinyanjui, B. 2017. Institutions, resources and innovation in East Africa: A firm level approach. *Research Policy*, 46: 280–291.

Barney, J. 1991. Firm Resources and Sustained Competitive Advantage. *Journal of Management*, 17: 99–120.

Barney, J. B. 1999. How a Firm's Capabilities Affect Boundary Decisions. *Sloan Management Review*, 40: 137–145.

Beugelsdijk, S. 2008. Strategic Human Resource Practices and Product Innovation. *Organization Studies*, 29: 821–847.

Boer, H., & During, W. E. 2001. Innovation, what innovation? A comparison between product, process and organizational innovation. *International Journal of Technology Management*, 22: 83–107.

Burgess, S., Lane, J., & Stevens, D. 2001. Churning dynamics: An analysis of hires and separations at the employer level. *Labour Economics*, 8: 1–14.

Caliendo, M., & Kopeinig, S. 2008. Some Practical Guidance for the Implementation of

Propensity Score Matching. *Journal of Economic Surveys*, 22: 31–72.

Carbery, R., & Garavan, T. N. 2005. Organisational restructuring and downsizing: issues related to learning, training and employability of survivors. *Journal of European Industrial Training*, 29: 488–508.

Chadwick, C., Hunter, L. W., & Walston, S. L. 2004. Effects of downsizing practices on the performance of hospitals. *Strategic Management Journal*, 25: 405–427.

Datta, D. K. D., Guthrie, J. P. J., Basuil, D., & Pandey, A. 2010. Causes and Effects of Employee Downsizing: A Review and Synthesis. *Journal of Management*, 36: 281–348.

Davenport, T. H. 1992. *Process innovation. Reengineering Work through Information Technology*. Boston, MA: Harvard Business School Press.

De Cuyper, N., & De Witte, H. 2006. The impact of job insecurity and contract type on attitudes, well-being and behavioural reports: A psychological contract perspective. *Journal of Occupational and Organizational Psychology*, 79: 395–409.

de Waal, A. A. 2007. Is performance management applicable in developing countries? *International Journal of Emerging Markets*, 2: 69–83.

Dougherty, D., & Bowman, E. H. 1995. The Effects of Organizational Downsizing on Product Innovation. *California Management Review*, 37: 28–44.

Ederer, F., & Manso, G. 2013. Is Pay for Performance Detrimental to Innovation? *Management Science*, 59: 1496–1513.

Fisher, S. R., & White, M. A. 2000. Downsizing in a Learning Organization: Are There

Hidden Costs? *The Academy of Management Review*, 25: 244–251.

Friebel, G., Heinz, M., & Zubanov, N. 2016. *The Effect of Announced Downsizing on Workplace Performance : Evidence from a Retail Chain*. Bonn.

Fritsch, M., & Meschede, M. 2001. Product Innovation, Process Innovation, and Size. *Review of Industrial Organization*, 19: 335–350.

George, G., Corbishley, C., Khayesi, J. N. O., Haas, M. R., & Tihanyi, L. 2016. From the Editors. Bringing Africa in: Promising Directions for Management Research. *Academy of Management Journal*, 59: 377–393.

Guo, S., & Fraser, M. W. 2015. *Propensity Score Analysis: Statistical Methods and Applications*. Thousand Oaks, CA: SAGE Publications, Inc.

Guthrie, J. P., & Datta, D. K. 2008. Dumb and Dumber: The Impact of Downsizing on Firm Performance as Moderated by Industry Conditions. *Organization Science*, 19: 108–123.

Hansson, M., & Gandolfi, F. 2015. A global perspective on the Non-Financial Consequences of Downsizing. *Review of International Comparative Management*, 16: 185–204.

Hipp, C., & Grupp, H. 2005. Innovation in the Service Sector: The Demand for Service-Specific Innovation Measurement Concepts and Typologies. *Research Policy*, 34: 517–535.

International Labour Organization. 2015. *Non-standard forms of employment*. Geneva. Retrieved from

http://www.ilo.org/wcmsp5/groups/public/---ed_protect/---protrav/---travail/documents/meetingdocument/wcms_336934.pdf

Karim, S., & Kaul, A. 2015. Structural Recombination and Innovation: Unlocking Intraorganizational Knowledge Synergy through Structural Change. *Organizational Science*, 26: 439–455.

Kawai, N. 2015. Does Downsizing Really Matter? Evidence from Japanese Multinationals in the European Manufacturing Industry. *The International Journal of Human Resource Management*, 26: 501–519.

Kim, H., & Sung-Choon, K. 2013. Strategic HR functions and firm performance: The moderating effects of high-involvement work practices. *Asia Pacific Journal of Management*, 30: 91–113.

Kok, R. A. W., & Ligthart, P. E. M. 2014. Differentiating major and incremental new product development: The effects of functional and numerical workforce flexibility. *Journal of Product Innovation Management*, 31: 30–42.

Love, E. G., & Nohria, N. 2005. Reducing slack: The performance consequences of downsizing by large industrial firms, 1977-93. *Strategic Management Journal*, 26: 1087–1108.

Marques, T., Galende, J., Cruz, P., & Portugal Ferreira, M. 2014. Surviving downsizing and innovative behaviors: a matter of organizational commitment. *International Journal of Manpower*, 35: 930–955.

Martínez-Sánchez, A., Vela-Jiménez, M. J., Pérez-Pérez, M., & Luis-Carnicer, P. de. 2009.

Innovation and labour flexibility: A Spanish study of differences across industries and type of innovation. *International Journal of Manpower*, 30: 360–376.

McKinley, W., Zhao, J., & Rust, K. G. 2000. A Sociocognitive Interpretation of Organizational Downsizing. *The Academy of Management Review*, 25: 227–243.

Mellahi, K., & Wilkinson, A. 2008. A study of the association between downsizing and innovation determinants. *International Journal of Innovation Management*, 12: 677–698.

Mellahi, K., & Wilkinson, A. 2010. Slash and burn or nip and tuck? Downsizing, innovation and human resources. *International Journal of Human Resource Management*, 21: 2291–2305.

Michie, J., & Sheehan, M. 2005. Business strategy, human resources, labour market flexibility and competitive advantage. *The International Journal of Human Resource Management*, 16: 445–464.

Ng, T. W. H., Feldman, D. C., & Lam, S. S. K. 2010. Psychological Contract Breaches, Organizational Commitment, and Innovation-Related Behaviors: A Latent Growth Modeling Approach. *Journal of Applied Psychology*, 95: 744–51.

OECD. 2005. *Oslo Manual. Guidelines for collecting and interpreting innovation data*. *Communities*.

OECD. 2012. *Innovation for Development: A Discussion of the Issues and an Overview of Work of the OECD Directorate for Science, Technology and Industry*.

Parzefall, M.-R., & Hakanen, J. 2010. Psychological contract and its motivational and

health-enhancing properties. *Journal of Managerial Psychology*, 25: 4–21.

Pavitt, K. 1991. Key Characteristics of the Large Innovating Firm. *British Journal of Management*, 2: 41–50.

Pezeshkan, A., Smith, A., Fainshmidt, S., & Amini Sedeh, A. 2016. National business systems and firm innovation: A study of developing economies. *Journal of Business Research*, 69: 5413–5418.

Pratheepkanth, P. 2011. Reward System And Its Impact On Employee Motivation In Commercial Bank Of Sri Lanka Plc, In Jaffna District. *Global Journal of Management and Business Research*, 11: 84–92.

Roper, S., & Hewitt-Dundas, N. 2015. Knowledge stocks, knowledge flows and innovation: Evidence from matched patents and innovation panel data. *Research Policy*, 44: 1327–1340.

Rousseau, D. M. 1989. Psychological and Implied Contracts in Organizations. *Employee Responsibilities and Rights Journal*, 2: 121–139.

Rousseau, D. M. 2004. Psycholoigcal Contracts in the Workplace: Understanding the Ties That Motivate. *Academy of Management Executive*, 18: 120–127.

Schaffner, J. A. 2001. Job Stability in Developing and Developed Countries: Evidence from Colombia and the United States. *Economic Development and Cultural Change*, 49: 511–535.

Shahin, N. 2014. Role of Employee Retention Practices in Indian Industry – A Study of Select MNCs in Jamshedpur. *International Journal of Engineering and Management*

Research, 206–213.

Spreitzer, G. M., & Mishra, A. K. 2002. To stay or to go: voluntary survivor turnover following an organizational downsizing. *Journal of Organizational Behavior*, 23: 707–729.

The World Bank. 2011. World Bank's Enterprise Survey. Understanding the Questionnaire. Retrieved July 7, 2016, from http://www.enterprisesurveys.org/~/media/GIAWB/EnterpriseSurveys/Documents/Methodology/Questionnaire-Manual.pdf

The World Bank. 2016. Enterprise Survey. Retrieved November 21, 2016, from https://www.enterprisesurveys.org/portal/index.aspx#/library?dataset=Combined

Thornhill, S. 2006. Knowledge, innovation and firm performance in high- and low-technology regimes. *Journal of Business Venturing*, 21: 687–703.

Torres, O. 2011. The silent and shameful suffering of bosses: layoffs in SME. *International Journal of Entrepreneurship and Small Business*, 13: 181–192.

van Riemsdijk, M., & de Leede, J. 2001. Flexible Labour Strategy in the Dutch Automotive Industry. *Creativity and Innovation Management*, 10: 243–250.

Wachsen, E., & Blind, K. 2016. More labour market flexibility for more innovation? Evidence from employer-employee linked micro data. *Research Policy*, 45: 941–950.

Wang, T., & Libaers, D. 2016. Nonmimetic Knowledge and Innovation Performance: Empirical Evidence from Developing Countries. *Journal of Product Innovation Management*, 33: 570–588.

Weiss, H. M., & Cropanzano, R. 1996. Affective Events Theory a theoretical discussion of the structure, causes and consequences of affective experiences at work. In B. M. Staw & L. L. Cummings (Eds.), *Research in organizational behavior: An annual series of analytical essays and critical reviews*: 1–74. Greenwich, CG: Jai Press.

Wright, P. M., & Snell, S. A. 1998. Toward a Unifying Framework for Exploring Fit and Flexibility in Strategic Human Resource Management. *The Academy of Management Review*, 23: 756–772.

Yu, G.-C., & Park, J.-S. 2006. The effect of downsizing on the financial performance and employee productivity of Korean firms. *International Journal of Manpower*, 27: 230–250.

Zanello, G., Mohnen, P., & Ventresca, M. 2016. The Creation and Diffusion of Innovation in Developing Countries: A Systematic Literature Review. *Journal of Economic Surveys*, 30: 884–912.

TABLE 1
Descriptive Statistics and Correlation Matrix (n=3,085)

	Variable	Mean	St. Dev.	Min	Max	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1	Innovation	1.28	1.21	0.00	3.00	-															
2	Country	88.87	47.59	16.00	132.00	0.03	-														
3	Firm Size	131.61	485.48	1.00	15,000	0.07	-0.12	-													
4	R&D	0.32	0.47	0.00	1.00	0.16	0.24	0.70	-												
5	Firm Type	0.18	0.39	0.00	1.00	0.15	-0.02	0.23	0.12	-											
6	Education	44.96	32.94	0.00	100.00	0.01	0.30	0.01	0.19	0.05	-										
7	Technologizing	14.07	31.01	0.00	100.00	0.06	0.04	0.09	0.17	0.10	0.10	-									
8	Export	0.25	0.43	0.00	1.00	0.08	-0.11	0.21	0.15	0.12	0.07	0.13	-								
9	Insourcing	0.24	0.43	0.00	1.00	0.17	0.13	0.01	0.09	0.10	0.07	0.04	0.02	-							
10	Outsourcing	0.21	0.41	0.00	1.00	0.14	0.11	0.01	0.10	0.09	0.06	0.01	0.04	0.38	-						
11	Reorganization - New Unit	0.34	0.47	0.00	1.00	0.15	0.23	0.06	0.11	0.09	0.08	0.04	0.00	0.22	0.24	-					
12	Reorganization - Merged Units	0.12	0.32	0.00	1.00	0.03	0.07	-0.00	0.02	-0.00	0.03	-0.02	-0.00	0.14	0.18	0.13	-				
13	Financial Performance	68.11	33.45	0.00	100.00	-0.12	-0.17	-0.01	-0.11	-0.09	-0.10	-0.07	-0.08	-0.08	-0.02	-0.08	0.05	-			
14	Downsizing	0.08	0.27	0.00	1.00	-0.03	0.07	-0.00	0.00	-0.03	0.04	-0.02	-0.02	0.10	0.15	0.20	0.36	0.05	-		
15	NF - Temporary Employee %	12.18	20.25	0.00	95.54	-0.04	-0.00	-0.10	-0.06	-0.07	0.05	-0.01	0.01	-0.00	-0.06	0.01	-0.00	-0.08	0.04	-	
16	FF - Training %	20.90	32.69	0.00	100.00	0.09	0.11	0.11	0.24	0.11	0.17	0.88	0.16	0.06	0.01	0.04	-0.05	-0.11	-0.04	-0.06	-
17	WRF - Employment Bonus	0.58	0.49	0.00	1.00	0.15	0.11	0.02	0.08	0.03	0.08	0.02	0.02	0.10	0.10	0.11	0.04	-0.06	0.02	-0.04	0.06

Table 2
Poisson Regression Models: Effect of Downsizing and the Interaction Effect between Downsizing and Labour Flexibility on Innovation (n = 2,988)

Variables	Model 1		Model 2		Model 3	
Control Variables	B	SE	B	SE	B	SE
Ghana (Country)	0.00	(.)	0.00	(.)	0.00	(.)
Bangladesh (Country)	0.47***	(0.14)	0.51***	(0.14)	0.52***	(0.14)
Tanzania (Country)	-0.10	(0.19)	-0.15	(0.20)	-0.16	(0.20)
Uganda (Country)	0.33*	(0.17)	0.30	(0.17)	0.30	(0.17)
Zambia (Country)	0.62***	(0.14)	0.64***	(0.14)	0.65***	(0.15)
Pakistan (Country)	-1.20**	(0.25)	-.107***	(0.25)	-1.06***	(0.25)
Kenya (Country)	-0.26	(0.17)	-0.26	(0.17)	-0.26	(0.17)
Nepal (Country)	-0.44*	(0.18)	-0.40*	(0.18)	-0.40*	(0.18)
India (Country)	0.34*	(0.14)	0.36***	(0.14)	0.37**	(0.14)
Firm Size	0.00	(0.00)	0.00	(0.00)	0.00	(0.00)
R&D	0.18***	(0.30)	0.18***	(0.30)	0.18***	(0.03)
Firm Type	0.09**	(0.30)	0.09**	(0.03)	0.08**	(0.03)
Education	0.00	(0.00)	-0.00	(0.00)	0.00	(0.00)
Technologizing	-0.00	(0.00)	-0.00	(0.00)	-0.00	(0.00)
Export	0.08**	(0.03)	0.08**	(0.03)	0.08**	(0.07)
Insourcing	0.18***	(0.03)	0.16***	(0.03)	0.16***	(0.03)
Outsourcing	0.06	(0.03)	0.07*	(0.03)	0.07*	(0.03)
Reorganization - New Unit	0.12***	(0.03)	0.13***	(0.03)	0.13***	(0.03)
Reorganization - Merged Units	0.01	(0.05)	0.04	(0.05)	0.04	(0.05)
Financial Performance	-0.00***	(0.00)	-0.00***	(0.00)	-0.00***	(0.00)
Direct effects of Downsizing and Labour Flexibility						
Downsizing			-0.16*	(0.07)	-0.41**	(0.15)
NF - Temporary Employment (%)			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 Employment					0.01***	(0.00)
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 3
Robustness Checks: Effect of Downsizing and the Interaction Effect between Downsizing and Labour Flexibility on Innovation (n = 2,988)

Variables	Model 4 - Nbreg		Model 5 - Ologit	
Control Variables	B	SE	B	SE
Ghana (Country)	0.00	(.)	0.00	(.)
Bangladesh (Country)	0.52***	(0.14)	1.23***	(0.28)
Tanzania (Country)	-0.16	(0.20)	-0.16	(0.37)
Uganda (Country)	0.30	(0.17)	0.73*	(0.34)
Zambia (Country)	0.65***	(0.15)	1.66***	(0.32)
Pakistan (Country)	-1.06***	(0.24)	-1.34***	(0.25)
Kenya (Country)	-0.26	(0.17)	-0.46	(0.32)
Nepal (Country)	-0.40*	(0.18)	-0.24	(0.32)
India (Country)	0.37**	(0.14)	0.91***	(0.27)
Firm Size	0.00	(0.00)	0.00	(0.00)
R&D	0.18***	(0.30)	0.44***	(0.80)
Firm Type	0.08**	(0.30)	0.21	(0.80)
Education	0.00	(0.00)	0.00	(0.00)
Technologizing	-0.00	(0.00)	-0.00	(0.00)
Export	0.08**	(0.03)	0.21*	(0.08)
Insourcing	0.16***	(0.03)	0.46***	(0.09)
Outsourcing	0.07*	(0.03)	0.21*	(0.08)
Reorganization - New Unit	0.13***	(0.03)	0.35***	(0.09)
Reorganization - Merged Units	0.04	(0.05)	0.04	(0.13)
Financial Performance	-0.00***	(0.00)	-0.00***	(0.00)
Direct effects of Downsizing and Labour Flexibility				
Downsizing	-0.41**	(0.15)	-0.89*	(0.35)
NF - Temporary Employment (%)	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)	0.37***	(0.07)
Interactions				
Downsizing X Temporary Employment	0.01**	(0.00)	0.02**	(0.01)
Downsizing X Training	0.00*	(0.00)	0.01	(0.01)
Downsizing X Bonus	0.07	(0.14)	0.08	(0.35)
Constant	-0.19	(0.15)		
Cut 1	0.07	(0.29)	0.42	(0.31)
Cut 2	1.03***	(0.29)	1.40***	(0.31)
Cut 3	1.96***	(0.29)	2.33***	(0.31)

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

TABLE 4
Endogeneity Tests for Downsizing and Innovation

Variables [a]	**Model 6** **Propensity Score (6 nearest neighbors)**		**Model 7** **Inverse-probability weighted regression-adjustment**	
	B	SE	B[c]	SE
Downsizing	-0.17*[b]	0.09	-0.20*	0.09
Country		matched	-0.00	0.00
R&D		matched	0.34***	0.05
Firm Type		matched	0.30***	0.05
Export		matched	0.03	0.05
Insourcing		matched	0.29***	0.05
Outsourcing		matched	0.20***	0.06
Reorganization - New Unit		matched	0.28***	0.05
Financial Performance		matched	-0.00***	0.00
Constant		n/a	1.29***	0.07
N		3,402		3,402
Model Significance		0.045		0.021
Year fixed effects		Yes		Yes

[a] inlcuded 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

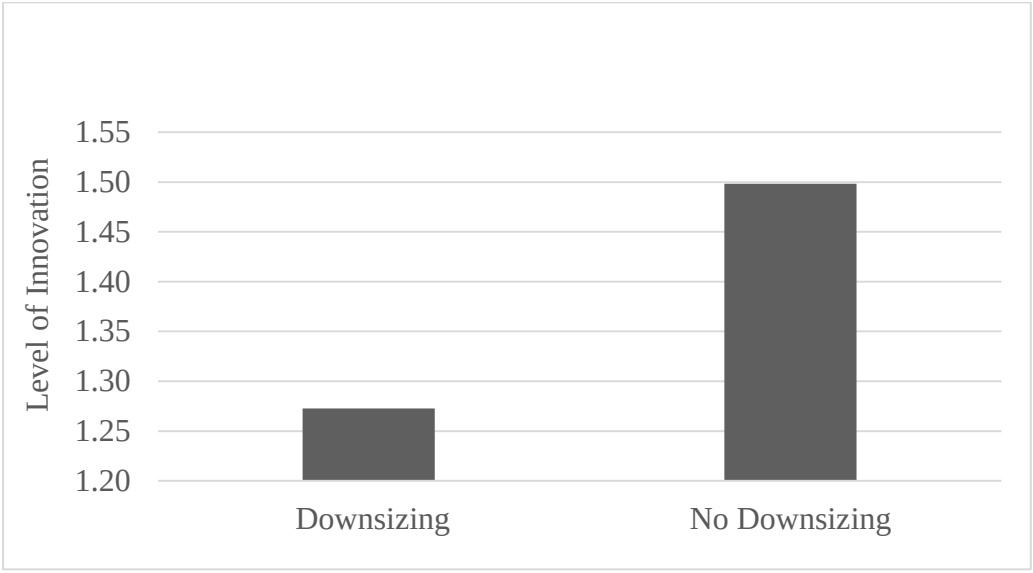

Figure 2

Predictive Margins of Downsizing with Numerical Flexibility

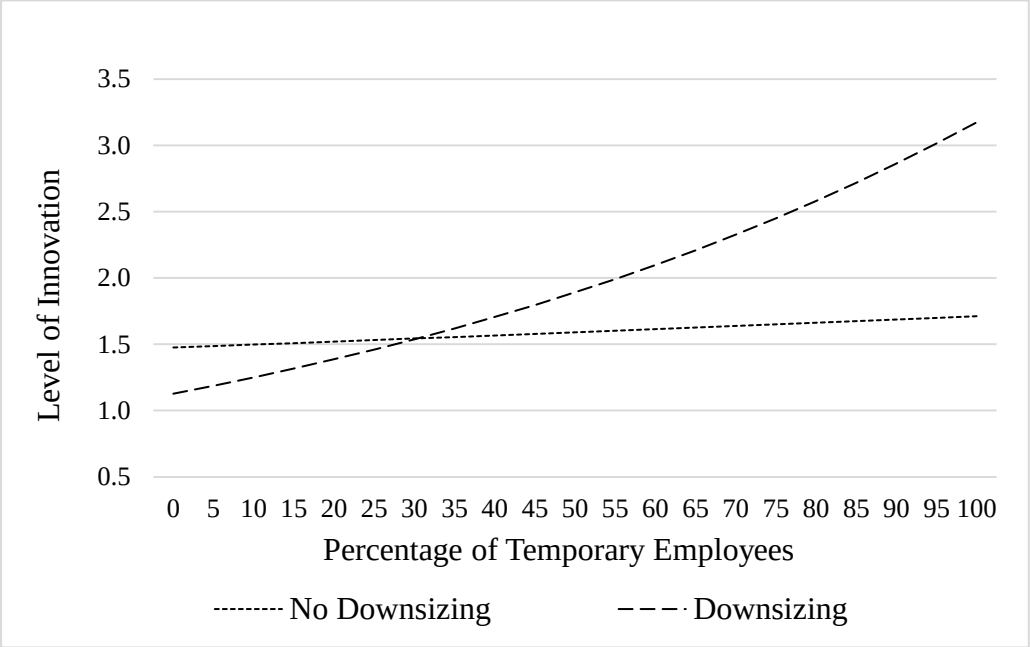

Figure 3

Predictive Margins of Downsizing with Functional Flexibility

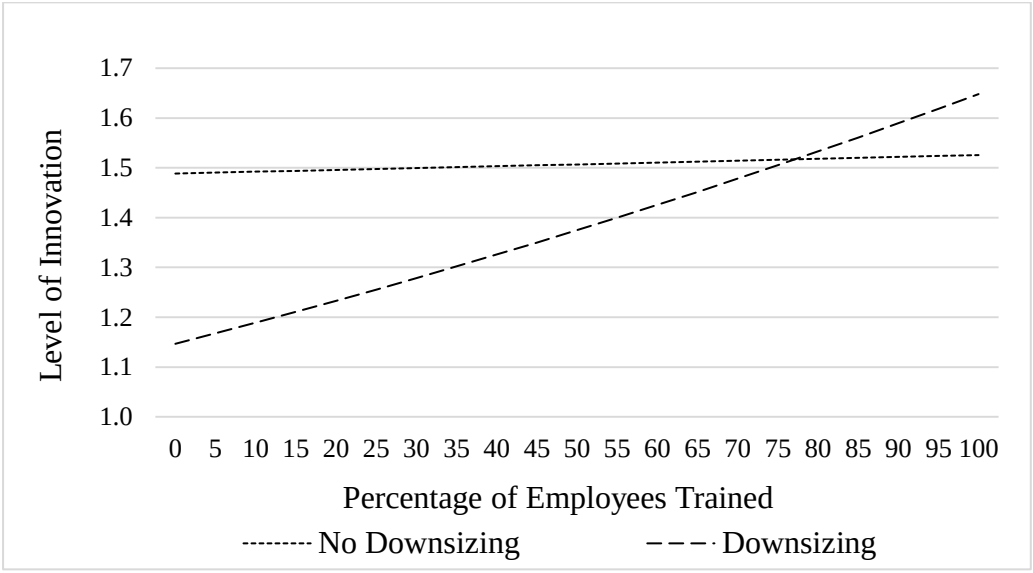

Figure 4

Predictive Margins of Wage and Reward Flexibility on Innovation