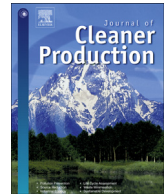




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Circular purchasing in Dutch and Belgian organizations: The role of intrapreneurship and organizational citizenship behavior towards the environment

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ABSTRACT

In the transition towards a circular economy, purchasers play a critical role as gatekeepers to the reuse of circular products in organizational processes. However, there is a need for research on the individual-level determinants of circular purchasing. Integrating the Theory of Planned Behavior, and the literature on organizational citizenship behavior towards the environment and intrapreneurship, we propose that the intention to act pro-environmentally, as expressed by organizational citizenship behavior towards the environment, is critical to circular purchasing. Moreover, we argue that intrapreneurship mediates this association, as intrapreneurs proactively make the effort and take risks in the process of creating new business opportunities. Using a survey among 124 Dutch and Belgian purchasers, this study shows that organizational citizenship behavior towards the environment is positively related to intrapreneurship. Contrary to what we hypothesized, intrapreneurship does not mediate the association between organizational citizenship behavior towards the environment and circular purchasing. Furthermore, purchasers in high-level hierarchical positions showed a stronger positive relationship between organizational citizenship behavior towards the environment and circular purchasing compared to purchasers in low-level hierarchical positions.

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1. Introduction

The transition towards an increasingly more circular economy is becoming relevant for a growing number of organizations. The circular economy refers to ‘an industrial system that is restorative or regenerative by intention and design’ (World Economic Forum, 2014, p.15). The underlying idea is that linear systems, i.e., systems that are based on a take-make-waste view, are not sustainable, as the end result of such systems is waste. What people or organizations do with this waste is not taken into account by linear systems, which implies that valuable materials are lost (Ghisellini et al., 2016). In contrast, the circular economy involves closing material loops and energy loops by long-lasting design,

maintenance, repair, reuse, remanufacturing, refurbishing, and recycling (Geissdoerfer et al., 2017, p. 759). In 2016, circular activities in the European Union (EU) generated 147 billion euros in added value and 17.5 billion euro in investment (European Commission, 2019). Despite the fact that the contribution of recycled materials has increased in the last few years, it is still the case that, in 2016, only 12% of resources used in the EU (and 9% worldwide) came from recycled materials (European Commission, 2019). These numbers indicate that there is still a long way to go.

The circular economy concept entails a new way of looking at products and requires a different organizational design in which the principles of reuse, recycle and reduce are included and in ways of purchasing (Ghisellini et al., 2016; Klein et al., 2020). However, regulations and/or reward systems for supporting circular activities are still being developed (European Commission, 2020; Rijksoverheid, 2019; Svensson and Funck, 2019), which creates few external incentives for organizations to implement circular activities. Therefore, developing circular activities including circular

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purchasing is largely dependent on internal initiatives. As such, purchasers play a critical role in this transition to a circular economy (Bals et al., 2018; Crespin-Mazet and Dontenwill, 2012; Giunipero et al., 2005; Klein et al., 2020; Lăzăroiu et al., 2020). They are responsible for selecting suppliers (Carter and Jennings, 2004), and therefore have a direct impact on an organization's interactions with the supply chain (Eltantawy et al., 2009). Despite the critical role of purchasers in the transition towards a circular economy, knowledge about the human side of circular economy and the determinants underlying the choice to implement circular purchasing is scarce (Chiappetta Jabbour et al., 2019; Sönnichsen and Clement, 2020). In this paper, we argue that circular purchasing is determined by Organizational Citizenship Behavior for the Environment (OCBE). OCBE is defined as voluntary and unrewarded environmental actions that go above and beyond the job requirements in an organizational setting. Examples include opting for solutions to make services and products more sustainable, or giving co-workers advice about environmental issues (Temminck et al., 2015). Drawing on the Theory of Planned Behavior (Ajzen, 1991) and integrating theory on OCBE (e.g. Banwo and Du, 2019; Yuriev et al., 2018) and studies on the circular economy (e.g., Ghisellini et al., 2016; Muranko et al., 2018), we propose that purchasers showing high levels of intention towards OCBE are more likely to engage in circular purchasing.

A recent review by Yuriev et al. (2018) shows that there are several barriers to OCBEs in the workplace. These include personal barriers, such as personal attitudes and lack of knowledge, but also organizational barriers including lack of supervisor support and lack of resources. Furthermore, circular purchasing is likely to be part of a new strategic direction for an organization (Bocken et al., 2016), one which requires purchasers to be proactive and take risks to act on OCBE. In order to overcome these barriers, we propose that OCBE is associated with circular purchasing through purchaser intrapreneurship. Intrapreneurship can be defined as “a process whereby employee(s) recognize and exploit opportunities by being innovative, proactive and by taking risks, in order for the organization to create new products, processes and services, initiate self-renewal or venture new businesses to enhance competitiveness and performance of the organization” (Neessen et al., 2019, p. 551). Given that circular purchasing is a new, innovative process, we consider intrapreneurship to be a critical behavior in the relationship between OCBE and circular purchasing. When other factors that are critical to circular purchasing, such as regulations (Walker et al., 2008), are not introduced in the organization, we propose that purchasers are required to engage in additional proactive and risk-taking behaviors to, for example, gain supervisory support and obtain additional resources to facilitate the process towards circular purchasing.

Finally, we argue that the association between OCBE and the level of circular purchasing is moderated by the hierarchical role of the purchaser. Lack of autonomy and resources are important organizational barriers to performing voluntary environmental-friendly behaviors (Yuriev et al., 2018). We propose that the hierarchical position of the purchaser will impact the extent to which a) OCBE is associated with circular purchasing, and b) the extent to which OCBE is associated with intrapreneurship. In our research we take the individual perspective and research the role of the individual purchaser in the transition towards a circular economy. To summarize, this survey study aims to examine the mediating role of purchaser intrapreneurship on the association between purchaser OCBE and the level of circular purchasing, as well as the moderating role of hierarchical level of the purchaser (see Fig. 1).

This study offers several contributions to current theory and practice. First, previous research has mainly focused on the technical aspects of a circular economy, however research on the role of individuals in this transition and specifically the role of purchasers is under

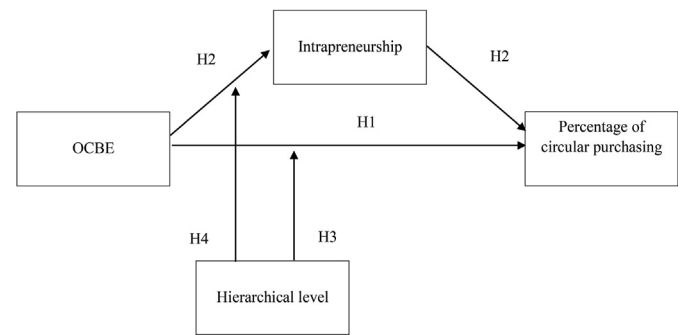


Fig. 1. Conceptual model.

researched (Geissdoerfer et al., 2017). Given the small role of external incentives for developing circular activities, initiating such activities is largely dependent on internal initiatives. We contribute to the literature by providing a more thorough understanding of the human factors contributing to a critical aspect of the circular economy, namely the role of circular purchasing (Genovese et al., 2017). More specifically, we focus on the individual purchaser to unravel when and how purchasers' OCBE leads to a higher level of circular purchasing. Second, previous research suggest a relationship between the intention to act and actual pro-environmental behavior (Blok et al., 2015; Yuriev et al., 2018). However, implementing circular activities, including circular purchasing, is a process involving many stakeholders and interests, requiring intrapreneurial behaviors such as risk taking and networking that, fueled by OCBE, supports the development of circular purchasing. We therefore contribute to the literature on voluntary environmental-friendly behaviors by elaborating on how OCBE can associate with impactful new business opportunities. Specifically, we explore intrapreneurship as a mediator and hierarchical role as a moderator of the relationship between OCBE and circular purchasing.

Thirdly, the purchasing function is changing. In the past purchasers focused on buying the necessary products for the lowest price (Farooque et al., 2019). Nowadays, we see a trend that purchasers develop more strategic competences (Genovese et al., 2017). They have more responsibility towards the circular goals of the organization.

Moreover, organizations and policymakers recognize the trend towards sustainability and circular economy. The long term goals set by the European Union and the national governments are clear, however the path towards these goals are less clear (Geissdoerfer et al., 2017; Svensson and Funck, 2019). Organizations are willing to invest in a more sustainable future. They see the necessity of circular economy as a need to be sustainable in the future but also to remain profitable. But they are struggling to find ways to stimulate change. This research helps policymakers and managers to see how the individual employees could impact this change and how investments related to these processes could benefit the organization.

In the following section we discuss the literature and formulate the hypotheses. In the third section we describe the methodology of this study, and in section 4 and 5 we respectively report the results and discuss the theoretical contribution of this study. We conclude with the limitations, future research directions and practical implications of this study.

2. Circular economy and the role of purchasers

The circular economy is increasingly seen as an important concept within the sustainability literature and it has gained traction within the world of policymakers (Geissdoerfer et al., 2017).

This is evident in the action plan of the European commission (European Commission, 2015). This action plan includes, for instance, the goal that all plastics should be recyclable by 2030 (European Commission, 2018). Furthermore, there is a prominent increase in research interest in this topic (Geissdoerfer et al., 2017). The circular economy model provides an alternative to the linear take-make-waste model, in which materials end up as waste and are not reused. The linear model has several negative effects on the sustainability of the natural system and therefore the sustainability of the economic model (Ghisellini et al., 2016). The circular economy approach strives to close the circle of materials and goods and eliminate waste as much as possible (Murray et al., 2017), and, as such, the circular economy is seen as a necessary condition for a sustainable economy, job growth, GDP growth, and the preservation of natural resources (Geissdorfer et al., 2017).

Purchasing in a circular economy requires more than just waste management. A broader system perspective is needed that encompasses the entire life cycle of products and processes and the interaction of this system with the environment and the economy (Klein et al., 2020). The circular economy is concerned with the creation of self-sustaining production systems (Genovese et al., 2017; Ghisellini et al., 2016). Ghisellini et al. (2016) reviewed the literature on the circular economy and identified the following key principles, each associated with specific challenges: design (1), reduce (2), reuse (3), recycle (4), reclassification of materials and nutrients so that materials are designed to be reused at the end of the cycle or safely returned to the ecosystem (5), and renewable energy as the energy source (6).

Purchasing professionals are the gatekeepers to the supply chain; their activities are aimed at controlling and tracking incoming materials and products. Purchasers are able to connect the goals of their organization to the goals of the suppliers and internal and external end-users. In collaboration with suppliers, they have a role in decreasing supplier risks and in increasing product innovation. They provide the connection between suppliers and internal business functions such as production and R&D (Van Weele and Van Raaij, 2014). Their important role and strategic position within the organization means that they can contribute to the bottom-up transition towards circularity (Genovese et al., 2017). To provide an example, purchasing professionals and supply chain managers can collaborate with suppliers to gain access to required materials and end-users in order to ensure that the products or services can be reused or recycled and that added value is created (Genovese et al., 2017; Klein et al., 2020). The pricing, time and value for product principles that purchasers use in their daily work are constantly evolving due to the transition towards a circular economy (Farooque et al., 2019). A literature review conducted by Farooque et al. (2019) found only three articles that connect the circular economy approach with procurement. These studies mostly focused on the barriers to a circular economy, namely the complex processes related to resource efficiency, technical issues and specifications, and the time and resources required to deal with these complex issues (Gaustad et al., 2018; Popa and Popa, 2016; Sprecher et al., 2017; Witjes and Lozano, 2016).

In conclusion, there is a need for studies that investigate the circular economy approach in relation to the role of purchasers. The circular economy approach entails a new, innovative way of looking at products and requires a different perspective in which the principles of design, reuse, recycle, and reduce, alongside reclassification and renewable energy, are included (Ghisellini et al., 2016). New product development (NPD) may be essential in the transition towards a circular economy. Research shows that including purchasing professionals in NPD results in a higher NPD performance (Nijssen et al., 2002). In our research we focus on the purchasers

and their changing role towards a more circular way of purchasing (Crespin-Mazet and Dantenwill, 2012; Giunipero et al., 2005).

2.1. OCBE and circular purchasing

OCBE are discretionary acts by employees within the organization that are directed toward environmental improvement; these actions are not rewarded or required by the organization (Daily et al., 2009, p. 252). OCBE is related to the concept of organizational citizenship behavior (OCB) which refers to voluntary behavior that improves the functioning of the organization but is not rewarded (Organ et al., 2006). Whereas OCB is directed towards individual persons (OCBI) or organizations (OCBO), OCBE is directed towards the environment (Temminck et al., 2015; Xerri and Brunetto, 2013). Individuals who score high on OCBE have a willingness to engage in actions that are positive for the environment.

According to the Theory of Planned Behavior (TPB, Ajzen, 1991), human actions are controlled by intentions. The TPB proposes that a person's intention to perform a behavior is the immediate determinant of that behavior (Ajzen, 1985, 2002). This suggests that the intention to act and to help others to act sustainably results in actual sustainable behavior. Antecedents of the intention to act are the attitude towards the specific type of behavior, the amount of behavioral control a person has over the situation, and the person's subjective norms (Ajzen, 1991; Blok et al., 2015; Muranko et al., 2018). Previous research has indicated that intention to act pro-environmentally increases the amount of pro-environmental workplace behavior that actually occurs (Blok et al., 2015; Yuriev et al., 2018), and that social norms and leadership support - which, according to the TPB, can be considered an antecedent of intention - increases pro-environmental workplace behavior (Blok et al., 2015). OCB is also found to increase job satisfaction, which is believed to support circular economy (Singh and Singh, 2019). In addition, some researchers have used the TPB to propose a model related to circular change behavior (Muranko et al., 2018). However, it is unknown if OCBE also increases circular purchasing. Circular purchasing is a complex form of pro-environmental behavior, where purchasers need to overcome certain hurdles within the organization and they need to convince other colleagues, such as the budget holders, to purchase in a circular manner. Following this line of reasoning, it can be hypothesized that a positive intention towards the environment as expressed by OCBE is positively related to actual circular purchasing behavior. Hence our first hypothesis:

Hypothesis 1. The level of OCBE of the purchaser is associated with a higher level of circular purchasing of the individual purchaser, as indicated by a higher portion of the individual purchasing budget being used for circular purchasing.

2.2. The mediating role of intrapreneurship

There are several personal and organizational barriers that hinder OCBE of the purchaser. In a recent review of the literature about pro-environmental behaviors, personal barriers were identified including social norms, perception of the infrastructure, attitude, time, knowledge, self-efficacy and awareness about environmental problems (Yuriev et al., 2018). In terms of organizational barriers, corporate values, support, resources, lack of communication, lack of autonomy and lack of exemplary role models were all found to be important (Yuriev et al., 2018).

Purchasers can contribute to a circular economy via their innovative role in the design of the product in collaboration with R&D and in their networking with different actors - both inside and outside the organization - to make sure that the materials used for products can remain in the circle of materials. Not everyone in the

market may be willing accept the changes that are part of this transition. This implies that certain behaviors, such as risk-taking and proactiveness, are needed for purchasers to overcome the perceived obstacles (Sönnichson and Clement, 2020). These types of behavior are all dimensions of intrapreneurship (Neessen et al., 2019). In general, intrapreneurship is found to be positively related to performance of the organization and the individual employee (Baggen et al., 2016; Fellnhofer et al., 2016; Sundin and Tilman, 2008; Urban and Wood, 2015; Wang et al., 2013). Intrapreneurship increases the number of new ideas that are adopted by management (Baggen et al., 2016) and it creates change (Sundin and Tilman, 2008). Intrapreneurs are also successful in recognizing opportunities - which in turn increases individual level innovation (Urban and Wood, 2015; Wang et al., 2013). Furthermore, research indicates that intrapreneurship of the individual employee is related to the organizational performance (Sieger et al., 2013). As intrapreneurship increases innovation and opportunity recognition, it is reasonable to assume that intrapreneurs are likely to be more innovative in relation to the development towards a more circular economy. Furthermore, the intrapreneurship of purchasers has been shown to be positively related to the quality of the relationship between internal consumers and suppliers (Steward et al., 2010).

In line with the TPB, when given a sufficient degree of actual control over the behavior, people are expected to carry out their intentions when the opportunity arises (Ajzen, 2002). However, there may be several barriers which prevent turning intentions into actions. Hence, it is not always possible for a person with a high level of OCBE to implement circular purchasing. TPB proposes that when people experience a high degree of control over their behavior, it increases a person's effort and perseverance to show the actual behavior (Ajzen, 2002). As such, actual behavior is jointly dependent on a person's motivation or intention, and a person's ability or behavioral control. Given the plethora of personal and situational barriers to pro-environmental behaviors (Yuriev et al., 2018), successful enactment of pro-environmental behavior requires effort in order to gain behavioral control. This is especially important within the transition towards circular purchasing. Circular purchasing is a complex form of behavior where multiple actors are involved. Intrapreneurship can be considered as a means by which to shape these opportunities to act pro-environmentally, as intrapreneurs proactively make the effort and take risks in the process of creating new business opportunities. Some researchers have pointed out that organizations need champions or 'green intrapreneurs' in order to increase their environmental performance and to ensure that green initiatives create actual change in a product or a process (Andersson and Bateman 2000; Boiral and Paillé, 2012; Sönnichson and Clement, 2020). Research indicates that organizational citizenship behavior is positively related to innovative behavior, since both often require extra work that goes above and beyond the basic job description (Xerri and Brunetto, 2013). Following this line of thought, we expect that intrapreneurship mediates the relationship between OCBE and circular purchasing (Hypothesis 2).

Hypothesis 2. The level of intrapreneurial behavior of the purchaser mediates the relationship between the level of OCBE and circular purchasing of the individual purchaser.

2.3. The moderating role of hierarchical level

TPB argues that perceived behavioral control is an important condition for how intentions lead to action (Ajzen, 2002). We propose that being in an organizational position of control will facilitate the extent to which OCBEs are associated with circular purchasing. Research has continuously demonstrated that

influence in organizations cascades down; norms and values at higher levels provide a context for perceptions and actions at lower levels (Griffin and Mathieu, 1997). Those in high-level hierarchical positions may therefore perceive a sense of control in terms of being able to influence others to adopt their norms and values. This may give rise to a high level of perceived behavioral control in relation to translating their behavioral intentions into action. In contrast, purchasers in low-level hierarchical positions may have lower perceived levels of behavioral control due to the limited levels of influence they have on others. Individuals in low-level positions are more likely to be dependent on support from their supervisors and have lower levels of autonomy, which negatively influence pro-environmental behaviors (Blok et al., 2015; Pinzone et al., 2016; Temminck et al., 2015). Moreover, Boiral et al. (2015) show that those in high-level hierarchical positions, such as leaders, must translate their OCBEs into concrete behaviors in order to stay credible. Therefore, to uphold their integrity, the intentions of those in high-level hierarchical positions have to be coherent with their displayed behaviors. In conclusion, we hypothesize that:

Hypothesis 3. The hierarchical level of the purchaser moderates the relationship between OCBE and circular purchasing: the relationship between OCBE and circular purchasing is stronger for those in high-level positions than for those in low-level positions.

Furthermore, we hypothesize that the purchaser's hierarchical position also impacts the association between OCBEs and intrapreneurship. Perceptions of behavioral control may also explain the association between OCBEs and intrapreneurial behaviors such as proactivity and risk-taking. Studies about intrapreneurship show that management support is an important organizational factor influencing the intrapreneurial behavior of employees (Brinkhurst et al., 2011). More specifically, lack of job autonomy experienced by the employee decreases intrapreneurship and pro-environmental behavior (Meynhardt and Diefenbach, 2012; Yuriev et al., 2018). As such, holding a position at a higher hierarchical level, implying that the purchaser has higher levels of influence and autonomy, goes hand-in-hand with having more discretion to translate OCBE into behaviors such as risk-taking and proactivity. Based on these arguments, we propose that for purchasers in high-level positions, the association between OCBEs and intrapreneurial behavior is stronger compared to those in low-level positions:

Hypothesis 4. The hierarchical level of the purchaser moderates the relationship between OCBE and the level of intrapreneurial behavior of the purchaser; the relationship between OCBE and intrapreneurial behavior is stronger for purchasers in high-level positions than for purchasers in low-level positions.

3. Methodology

3.1. Data gathering and sample

In line with previous research on OCBE and intrapreneurship (Chen et al., 2015; Fellnhofer et al., 2016; Moriano et al., 2014; Rigtering and Weitzel, 2013; Temminck et al., 2015; Wang et al., 2013) we used the survey method to investigate our research question. A survey is often used in a deductive study where specific relationships between variables can be tested (Saunders et al., 2019). In this research the relationships between OCBE, intrapreneurship and circular purchasing is tested as presented in the conceptual model in Fig. 1. The research concepts are measurable using validated scales. It also allows for a large and diverse sample, which increases the generalizability of the results. The level of generalizability is related to the level in which the population is reflected in the sample (Saunders et al., 2019). In our research we

sent the survey to Dutch and Belgian purchasers. Therefore the results can only be generalized to purchasers in these geographical areas. Purchasers were contacted by email through the Dutch and Belgian Purchasing Associations and via a message on a Dutch internet forum for purchasing professionals. In addition, the members of a Dutch group of purchasers working for large companies were asked to promote this survey amongst their purchasing professionals, via a link to the online survey. These regions were chosen because The Netherlands and Belgium are both countries within the European (EU) in which circular economy is a high on the sustainability agenda. The European Commission stated an action plan that includes explicit goals related to circular economy (European Commission, 2015, 2018). The Dutch and Belgian Purchasing Associations also promote circular purchasing amongst their members via for instance keynote speakers at network meetings. Participation in the survey was anonymous. Participants gave consent and were notified that there were no right or wrong answers. They were also notified that they could stop participating if they wanted. In total, we received 239 responses of which 124 were complete and useable. Of the useable responses, 27.4% came from Flanders, and 67.7% of respondents were male. The majority of respondents worked in a strategical (44.4%) or tactical (30.6%) purchasing function. Furthermore, 58.9% of the participants worked for a profit organization in comparison to 30.6% who worked for a non-profit or governmental organization. Most of the participants were between 40 and 59 years old (62.1%) and 22.5% were younger than 39 years (see Table 1). The total reach of the survey cannot exactly be determined as the survey was partly disseminated via newsletters and fora in addition to targeted e-mails. As a result, we cannot determine the exact response rate. However, the size of the resulting sample is comparable to other empirical studies in the field (e.g., Feng et al., 2020; Lee et al., 2015; Mitra and Datta, 2014).

Table 1
Characteristics of the participants.

	Frequency (n = 124)	Percentage (%)
<i>Nationality</i>		
Netherlands	87	70.2
Belgium	34	27.4
<i>Gender</i>		
Male	84	67.7
Female	40	32.2
<i>Type of organization</i>		
Profit	73	58.9
Non-profit/governmental	38	30.6
<i>Age</i>		
< 30 years	5	4
30–39 years	23	18.5
40–49 years	38	30.6
50–59 years	39	31.5
> 60 years	4	3.2
<i>Education level</i>		
Higher secondary education	5	4
Lower secondary education	4	3.2
Vocational education	15	12.1
Higher education	53	42.7
Scientific education	45	36.3
<i>Hierarchical level</i>		
Operational	8	6.5
Tactical	38	30.6
Strategical	55	44.4
Manager	17	13.7
Board	6	4.8

3.2. Measures

The survey consisted of a number of questions related to the behavior of purchasers and their level of circular purchasing. *Organizational citizenship behavior towards the environment (OCBE)* was measured using a scale developed by Temminck et al. (2015) consisting of 7 items (e.g. “try to make innovative environmental suggestions to improve the organization”). The cronbach’s alpha of the OCBE scale was high ($\alpha = 0.893$).

Based on the literature review of Neessen et al. (2019), we used the constructs opportunity recognition, internal and external networking as well as innovativeness, pro-activeness and risk-taking to measure the *intrapreneurship* of purchasers. We combined several scales measuring these concepts in order to construct an overarching measure of intrapreneurship. Variations of the subscales for innovativeness, proactiveness and risk-taking were used to measure individual intrapreneurship in other studies as well (e.g. Chen et al., 2015; Fellnhöfer et al., 2016; Moriano et al., 2014; Rigtering and Weitzel, 2013), indicating the usefulness of these scales to measure intrapreneurship. For innovativeness, proactiveness and risk-taking, we used a scale adapted individual entrepreneurial orientation scale by Fellnhöfer et al. (2016) (Bolton, 2012; Bolton and Lane, 2012) (e.g. “step-up and get things going on projects always trying to take the initiative in every situation rather than sit and wait for someone else to do it”). For opportunity recognition, we used a scale developed by Wang et al. (2013) (e.g. “While going about routine day-to-day activities, I see potential new venture ideas all around me”). The scale developed by Chen et al. (2015) was used to measure networking (e.g. “be good at communicating with other departments in order to discuss issues about new product on a regular basis”). The combination of these scales resulted in 24 items measuring sub-dimensions of intrapreneurship. OCBE and intrapreneurship were measured with a 5-point Likert scale, ranging from 1 (completely disagree) to 5 (completely agree). Reliability analysis revealed a low reliability of the subscale pro-activeness ($\alpha = 0.337$). The opportunity recognition scale also had low reliability. However, after excluding item 3, the reliability increased to an acceptable level ($\alpha = 0.642$). The other scales - innovativeness ($\alpha = 0.789$), risk-taking ($\alpha = 0.664$), internal networking ($\alpha = 0.869$), and external networking ($\alpha = 0.714$) - were deemed to be reliable.

The *hierarchical level of the purchaser* was assessed by asking the participants to indicate their position in their organization. They had five options, namely operational function, tactical function, strategical function, manager and director. The latter three roles were recoded to denote a high hierarchical level and the first two were recoded to denote a low hierarchical level.

Finally, *circular purchasing* was measured by asking participants to indicate what percentage of their personal amount of corporate purchasing was purchased in a circular manner, ranging from 0 to 100% (with 10% intervals). The individual purchaser is the best source for this individual-level information, because of they have first-hand knowledge of their own actions and the level of their own circular purchasing. Other data - such as department data - reflects the overall circular performance and does not reflect the individual effort. Before we asked this question, we explained the construct of circular economy, which we described as: ‘a system in which the circle of products and materials is closed and that waste is minimized’.

A number of control factors were included in the study, such as type of organization (1 = non-profit; 2 = profit), age in categories (1 = younger than 30; 2 = between 30 and 39; 3 = between 40 and 49; 4 = between 50 and 59; 5 = older than 60), gender (0 = male, 1 = female) and educational level (1 = higher secondary education; 2 = lower secondary education; 3 = vocational education;

4 = higher education; 5 = scientific education).

3.3. Analysis

The dependent variable in this study is a censored variable, i.e., the exact percentage of circular purchasing was not observed, therefore we used a Tobit regression to test our hypotheses (Muthén and Muthén, 2017). Using Mplus 7, we specified our dependent variable, the percentage of circular purchasing, as a censored variable with a floor effect, as 44.8% of the respondents indicated that up to 10% of their purchasing is circular. A maximum likelihood estimation with robust standard errors (MLR) was used because this is found to be robust to non-normality (Muthén and Muthén, 2017). To test the mediated association between OCBE and percentage of circular purchasing via intrapreneurship in Hypothesis 2, we calculated the indirect effect by multiplying the beta-weights of the a-paths (OCBE on intrapreneurship) and b-paths (intrapreneurship on percentage of circular purchasing). Finally, we tested the moderating role of hierarchical level (Hypotheses 3 and 4) by mean centering the independent and moderating variables before calculating the interaction term.

4. Results

4.1. Measurement model

A confirmatory factor analysis (Table 2) showed a good fit (RSMEA = 0.056; CFI = 0.922; TLI = 0.908) and legitimized the use of this combined measure for intrapreneurship, with the exception of pro-activeness and one item measuring opportunity recognition which were deleted from further analysis due to the low reliability score (Schreiber et al., 2006). When OCBE was included in the model (Model 4), the fit decreased (RSMEA = 0.066; CFI = 0.877; TLI = 0.858). Furthermore, the BIC and the AIC scores were higher, (6758.44 and 6490.51 respectively) than for the model including only the five intrapreneurship factors (Model 2) or the second order 1 factor model (Model 3). This suggested that OCBE should be treated as a separate variable.

4.2. Hypothesis tests

The correlation analysis (see Table 3) revealed that OCBE and intrapreneurship were correlated, but there was no indication of multicollinearity. Moreover, we found that the control variables

'type of organization', age, gender, and educational level were not correlated with the three main variables, i.e. OCBE, intrapreneurship and circular purchasing. Only educational level was correlated with the variable 'hierarchical level', which is a relationship that could be expected. The higher the position of the purchaser within the organization is, the higher this person is educated. Often a certain level of education is a prerequisite of certain position. Besides educational level, gender seems to be correlated with the type of organization. In our sample, more females work as non-profit organizations. Following recommendations of Becker (2005) and Bernerth and Aguinis (2016) about the parsimonious use of control variables, we excluded these control variables from further analysis.

Table 4 shows the results of the Tobit SEM regression analyses. The first hypothesis proposed that the level of OCBE of the purchaser is associated with a higher level of circular purchasing of the individual purchaser. The regression results show that the direct relationship between OCBE and circular purchasing was not significant. The first hypothesis was not supported. However, when we included the moderator hierarchical level of the purchaser, the relationship between OCBE and circular purchasing (Hypothesis 3) was significant. The variables OCBE and hierarchical level interact with each other ($b = 18.48$; $p < 0.01$). We found a conditional effect of hierarchical level on the relationship between OCBE and the percentage of circular purchasing. There was a positive association between OCBE and circular purchasing ($b = 9.020$ (2.378), $p < 0.001$, 95% confidence interval: 4.359 to 13.682) for purchasers in a high-level position, e.g. strategic, manager or director. There was a non-significant negative association ($b = -9.467$ (6.637), $p = 0.15$, 95% confidence interval: -22.48 to 3.54) between OCBE and circular purchasing for purchasers in a low-level position. The interaction effect is shown in Fig. 2. The second hypothesis referred to the mediation model in which intrapreneurship was hypothesized to mediate between OCBE and circular purchasing. The results show no mediation effect. We did find a positive association between OCBE and intrapreneurship ($b = 0.18$; $p < 0.05$). However, when we included the proposed moderator in this mediation model (Hypotheses 3 and 4), we found that hierarchical level does influence the relationships between the variables. Furthermore, hierarchical level did not moderate the relationship between OCBE and intrapreneurial behavior (Hypothesis 4), but, as mentioned before, we did find a moderation effect of hierarchical level on the relationship between OCBE and circular purchasing (Hypothesis 3).

Table 2
Results of the confirmatory factor analysis.

	χ^2 (DF)	RSMEA	CFI	TLI	BIC	AIC
Model 1: 1-factor model	626.65 (170)*	.147	.456	.393	5365.92	5196.71
All 20 intrapreneurship items separately						
Model 2: 5-factor model	184.79 (140)*	.051	.925	.939	4876.77	4682.17
1: innovativeness						
2: risk-taking						
3: internal networking						
4: external networking						
5: opportunity recognition						
Model 3: Second order 1-factor analysis.	201.98 (145)*	.056	.922	.908	4869.88	4689.38
Intrapreneurship (consisting of the factors of Model 2)						
Model 4: 6-factor model	434.35 (282)*	.066	.877	.858	6758.44	6490.51
1: innovativeness						
2: risk-taking						
3: internal networking						
4: external networking						
5: opportunity recognition						
6: OCBE						

Table 3
Correlation matrix.

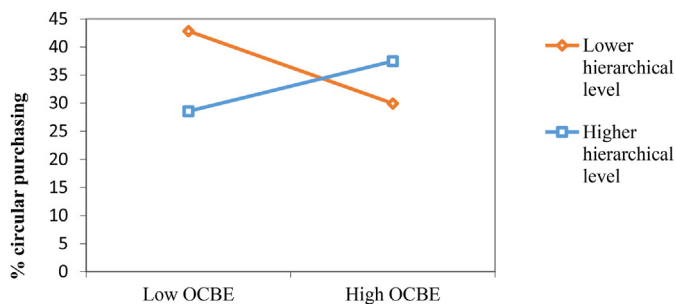
Variables	Mean	s.d.	1	2	3	4	5	6	7
1 Intrapreneurship	3.91	.38							
2 OCBE	3.32	.68	.31**						
3 % circular purchasing	15.74	18.25	-.10	.04					
4 Type of organization (non-profit 1; profit 2)	1.66	.48	-.03	-.11	.19				
5 Hierarchical level (high 1; low 0)	.63	.48	.23*	.04	-.11	.09			
6 Age group (5 groups)	3.13	.94	.02	.02	-.16	-.01	.10		
7 Gender (male 0; female 1)	.32	.469	-.02	-.06	.03	-.25**	-.011	-.14	
8 Education level (5 groups)	4.06	.10	.07	-.02	-.14	-.07	.28**	.05	-.02

Notes: n = 124. *p < .05, **p < .01.

Table 4
Results of Tobit SEM regressions.

	Unstandardized beta	SE
<i>Direct effects on CP</i>		
Intrapreneurship	−6.334	4.519
OCBE	2.180	2.932
Hierarchical level	−3.171	4.058
OCBE x Hierarchical level	18.488*	6.952
<i>Direct effects on I</i>		
OCBE	0.180*	0.053
Hierarchical level	0.143*	0.064
OCBE x Hierarchical level	−0.007	0.106
R ²	0.101*	

Notes. CP is the abbreviation for the percentage circular purchasing. I refers to intrapreneurship. OCBE denotes organizational citizenship behavior towards the environment. *p < .05, **p < .01.

**Fig. 2.** Interaction effect of hierarchical level and OCBE on the percentage of circular purchasing.

5. Discussion

The aim of this study was to investigate the relationship between OCBE and circular purchasing and to establish whether intrapreneurship mediates the relationship between OCBE and circular purchasing. Finally, we explored whether this relationship is moderated by the hierarchical level of the purchasers. In line with previous research of OCBE and intrapreneurship we investigated the hypothesized relationships using survey research (Chen et al., 2015; Fellnhofer et al., 2016; Moriano et al., 2014; Rigtering and Weitzel, 2013; Temminck et al., 2015; Wang et al., 2013) and considering the type of dependent variable, namely the censored variable circular purchasing, a Tobit regression analyses was executed (Muthén and Muthén, 2017). As hypothesized, we found a positive relationship between OCBE and circularity, but only for the purchasers in a high-level hierarchical position. We found a non-significant negative association for purchasers in a low-level position. In the following paragraphs we discuss the results with the

theory. Following the discussion of the theoretical contributions, we discuss the practical contributions and the limitations of this study.

5.1. Theoretical contributions

Our research has several theoretical contributions. Firstly, our research investigated whether the intention to act pro-environmentally increases circular purchasing which is a complex form of pro-environmental workplace behavior and involves multiple actors. This was based on the Theory of Planned Behavior. We theorized that the intention to act pro-environmentally, as indicated by OCBE, precedes the actual behavior, in our case circular purchasing (Ajzen, 2002). Previous research indicated that the intention to act pro-environmentally increases the amount of pro-environmental workplace behavior and innovative behavior (Banwo and Du, 2019; Blok et al., 2015; Xerri and Brunetto, 2013; Yuriev et al., 2018). Our findings suggest that this is indeed the case for purchasers in high-level positions, but not for purchasers in low-level positions. This indicates the importance of a certain level of behavioral control, which is reached due to the nature of the function. This is in line with previous research investigating the contextual predictors (e.g. perceived behavioral control and social norms) of pro-environmental behaviors (Banwo and Du, 2019). Purchasers in a high-level position are likely to perceive their behavioral control as high. Perceived behavioral control is proxy for actual behavioral control (Sheeran et al., 2003). This implies that those with a high level of actual control also have a high level of perceived behavioral control. The TPB theorizes that behavioral control is an antecedent of intention, but previous research has indicated that behavioral control can moderate the relationship between intention and behavior (Ajzen, 2002). We show that if the purchaser has a high level of OCBE, a higher hierarchical status will help to stimulate circular purchasing activities. When OCBE is low, however, a higher hierarchical status will lead to lower levels of circular purchasing. This may suggest that, when the purchaser does not report to engage in pro-environmental actions, the purchaser in higher positions will give priority to arguments against circular purchasing, for example due to his or her responsibility for maintaining budgets. Purchasers in lower hierarchical levels are less constrained by such responsibilities and are more likely to engage in circular purchasing activities, even if they report few OCBEs. In conclusion, we show that OCBEs are particularly important to circular purchasing activities for those in higher hierarchical positions. The first theoretical contribution of our research is therefore to suggest that the relationship between intention of OCBE and the circular purchasing behavior is present, but depends on certain conditions, in our case a combination of actual and perceived behavioral control. Therefore, our study adds to the knowledge regarding the applicability of TPB in sustainability research.

Secondly, we found a relationship between OCBE and intrapreneurship, but not between intrapreneurship and circular purchasing. We hypothesized that in order to overcome the personal and organizational barriers (Yuriev et al., 2018), purchasers with the intention to be pro-environmental need to be intrapreneurial in order to act upon their sustainable intentions and increase the circular purchasing. Our finding did not support this reasoning. It appears that the mechanism by which OCBE is related to circular purchasing is not via intrapreneurship. Moreover, hierarchical level did not influence these results. We predicted that there would be a relationship between OCBE and intrapreneurship because OCBE entails behavioral actions that go above and beyond the job requirements (Temminck et al., 2015), for example, taking risks and committing to extra work. These types of actions can also be described as behavioral dimensions of intrapreneurship. Previous research has indicated that organizations need 'green intrapreneurs' to increase their sustainable performance and to actually create change (Andersson and Bateman, 2000; Boiral and Paillé, 2012). Even though we did find a relationship between green intention and intrapreneurial intention, pro-environmental behaviors such as circular purchasing may require specific intrapreneurial behaviors that are also oriented towards the environment, specifically targeting stakeholders who are important to circular purchasing. Furthermore, the transition towards circular purchasing is likely to take time, which could explain the lack of relationship between intrapreneurship and circular purchasing.

Thirdly, our research showed that the Theory of Planned Behavior is a useful theory to investigate the human factors which are influential in increasing circular purchasing. We contribute to the theory by showing that the hierarchical position of the purchaser is important. This seems to be related more to the function of the individual and the structure of the organization than to the individual characteristics of the purchaser. These results increase our understanding about the conditions under which pro-environmental intentions and sustainable behavior are more or less likely to occur. In an additional analysis, we tested the role of hierarchical position as a constraining factor, but the position did not moderate the association between intrapreneurship and circular purchasing. This may indicate that constraints go beyond individual behavioral control and may include factors such as organizational climate, maturity and technical and organizational alignment. To provide an example, circular purchasing and the circular economy may be concepts that are used in the communication of an organization but that have not yet found their way into the processes of the organization. More specifically, the organizational views and goals that are communicated towards the outside market may not be in alignment with the inner organization. Previous research indicates that the alignment of the processes with top-management strategy is related to the effectiveness of sustainability incentives and HRM practices and, as an indirect result, sustainable performance (Chiappetta Jabbour et al., 2019; Parisi, 2013). Research also indicated that there are several constraints on an organizational level, for instance involvement of top management, regulations, rewards, education, awareness and reputation of the organizations (Appollini et al., 2014; Blome et al., 2013; Giunipero et al., 2012; Large et al., 2013; Walker et al., 2008; Zaidi et al., 2020). Previous research also indicates that the organizational learning capacity and management control is important to increase innovation and circular purchasing (Grandia and Voncken, 2019; Svensson and Funck 2019). These factors might hinder or stimulate the purchaser to act upon their intention and to increase their circular purchasing. The lack of effect of intrapreneurship and the moderating effect of hierarchical level, could indicate that there are other factors at an organizational level that influences the level of circular purchasing and the level of intrapreneurship.

5.2. Practical contributions

Our study showed the importance of the human factor in investigating the transition towards circular purchasing. Taking the individual perspective of the purchaser into account would be beneficial. Organizations and policymakers recognize the trend towards sustainability and circular economy. The long term goals set by the European Union and the national governments are clear, however the path towards these goals are less clear. This research helps policymakers and managers to see how the individual employees could impact this change and how investments related to these processes could benefit the organization. Intrapreneurship and OCBE are intentions and behaviors that could be stimulated by the organizations. Organizations could for instance implement policies to create an environment in which the purchasers could act upon their positive intention towards green behavior. Or they could stimulate intrapreneurial behavior, such as proactiveness, risk taking, innovativeness, networking and opportunity recognition, by creating a support base or implement policies around rewards and reinforcements.

5.3. Limitations

There are some limitations to this study. We contacted a high number of purchasers via several routes, mostly indirectly via networks or via purchasing associations. This may be the reason the total number of useable responses was low. We advertised the survey by stating that we were exploring the changing role of purchasers. We specifically withheld from mentioning circular purchasing in the opening statement of the survey, so that purchasers who work in organizations that are not really 'sustainability minded' also felt inclined to participate.

We also included both profit and non-profit organizations in our research sample. Although we did not find any effect of type of organization on the results, we realize that the purchasing processes will be different for purchasers working in a non-profit environment versus a profit organization.

Another limitation is related to our choice of concepts. The concept of circular purchasing may still be difficult to interpret. The actual practicality of the concept may not have been entirely clear, even though we did inform respondents that circular purchasing is defined as purchasing based on the principle of circular economy - which is a system in which the circle of products and materials is closed and that waste is minimized. It must be clear for all parties involved what a circular economy is and how it could be brought into practice. Based on our results, we think that the 'vagueness' of the concept results in the perception of a high-risk factor and uncertainty for the actors involved. Subsequently, taking the step to actually purchase in a circular manner may be too risky, even for intrapreneurial purchasers who are used to accepting higher risk and dealing with more uncertainty in relation to projects. This may also explain the lack of results regarding the mediating role of intrapreneurship between OCBE and circular purchasing.

6. Conclusion

Based on the theoretical contributions explained in the discussion section, we have identified several future research directions. A possible future research direction could be to further investigate the relationship between OCBE and circular purchasing and the influence of the antecedents of intention according to the TPB (Ajzen, 1991, 2002). In our research, we focused on the behavioral control aspect as reflected in the hierarchical level of the purchasers, but it would also be interesting to investigate the potentially positive effects of other antecedents, e.g. subjective norms

and attitude. The antecedents subjective norms and attitude were included in a study conducted by Greaves et al. (2013). They studied the effect of the three antecedents on behavioral intentions in the workplace, but they did not study the relationship between intention and behavior.

Future research could also investigate the possible factors that hinder green intrapreneurs from purchasing in a circular manner. One research direction may be to look into the effect of organizational constraints of intrapreneurship (Hornsby et al., 2002; Neessen et al., 2019). Another possibility would be to set up a longitudinal research design in which the effects of intrapreneurship are allowed to evolve over time, bearing in mind that circular purchasing is a complex and delicate process (Levering and Vos, 2019).

6.1. Concluding remarks

The purpose of this study was to investigate the relationship between OCBE and circular purchasing and to determine whether this relationship is mediated by intrapreneurial behavior. We also explored whether this relationship is moderated by the hierarchical level of the purchasers. Studies have indicated that more research is needed into the behavior of purchasers leading towards more circular purchasing. Our study yielded several initial results about this relationship. To summarize, the results show that a) there is no direct effect between OCBE and circular purchasing, this effect is only significant for high-level purchasers, not for low-level purchasers. Furthermore, we found b) a relationship between OCBE and intrapreneurship, but not between intrapreneurship and circular purchasing, suggesting that intrapreneurship is not a mediating factor. In general, we can conclude that c) human factors can influence the success of circular purchasing, particularly structural factors such as the hierarchical position of the purchasers, as demonstrated in the results of this study.

CRedit authorship contribution statement

Petra C.M. Neessen: Conceptualization, Methodology, Software, Investigation, Formal analysis, Writing - original draft. **Jeroen P. de Jong:** Supervision, Writing - review & editing, Formal analysis. **Marjolein C.J. Caniëls:** Supervision, Writing - review & editing. **Bart Vos:** Supervision, Writing - review & editing.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper

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