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How Pride Triggered by Pro-environmental Technology Adoption Spills Over into Conservation Behaviours: A Social Business Application

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ABSTRACT

Based on a new social business initiative, aiming to reduce CO₂ emissions in China with the development of a new solar photovoltaic/thermal system that promises higher overall energy efficiency, lower costs, and better monitoring and control settings than existing systems, this study examines how pride triggered by environmentally-friendly technology adoption spills over into conservation behaviours. The study used an online survey of 163 Chinese customers and a pride-inducing methodology to investigate how pride in purchasing pro-environmental technology could lead to positive spillovers. A Partial Least Squares approach to Structural Equation Modelling was used to analyse the results. Feelings of pride elicited by the intentions to purchase the novel technology positively affect subsequent behaviours of reducing energy consumption by other means (same domain), as well as recycling and reusing materials (different domain). Pride appeals can be leveraged by social businesses as by definition they focus on the social good and, according to our findings, pride-inducing messages enhance the impacts of the pro-environmental technology adoption. Such spillovers can be beneficial to society, thus allowing social businesses to satisfy social and financial goals at the same time.

1. Introduction

The growing trend of social businesses, whose ultimate goal is value for society rather than profit maximisation (Gold et al., 2020), has brought about numerous opportunities and challenges. A social business borrows elements from both commercial companies that aim to maximise profit - creating shareholder value - and non-profit organisations, which exist to fulfil social objectives. A social business is a self-sustaining organisation that covers its full costs from its operations, and its owners are entitled to recover their invested money; but it is more cause than profit-driven (Yunus et al., 2020). Thus, social businesses implicitly capitalise on the idea of positive spillovers generated by an economic activity, to contribute to diverse socio-economic and ecological issues (Yunus et al., 2020). According to the Cambridge Oxford Dictionary, a spillover is defined as “the effects of an activity that have spread further than was originally intended”. The difference is that in the case of social businesses, the spillover is *intentional*, from economic activity to social good, to allow the business to achieve its primary aim i.e., contribute to value

for society. Without taking into account the concept of spillovers, the social benefits delivered by a business’s action could also be underestimated (Torres, 2015). This is not something that social businesses should take lightly as “failure to account for them [spillovers] increases the cost of meeting a particular ... objective, making it less acceptable” (Torres, 2015, p. x) to other people/entities and society at large. Yet, the role of spillovers has been overlooked in past social business research.

In addition, given that we live in an increasingly interconnected world, the effects of a company’s behaviour can be heard, seen, and known in the marketplace with lightning speed thanks to digital communications, with critical reputational consequences. Consequently, a business has to be aware of the potential spillover effects that their operations are likely to generate. For example, energy efficiency savings could be cancelled out by other behaviours due to the re-bounce effect e. g., increasing energy consumption or spending savings on a flight (Rowley, 2011). This example illustrates how even though energy efficiency solutions are good for the environment, they can also do harm. Thus, any business, and more importantly a social business, whose

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primary aim is to serve society, needs to ensure that its actions (i.e., selling products or services) positively impact society (societal good over harm). Hence, understanding spillovers is imperative, especially for social businesses.

This study makes two important contributions. Firstly, we fill the aforementioned gap identified in the social business literature by examining how social businesses can leverage spillovers to achieve their goals and satisfy social and financial goals at the same time. This approach is valuable for further research, as the social business literature is largely underdeveloped (Bell, 2003; Teasdale, 2010; Yunus et al., 2010; Engelke et al., 2015). To this end, a new social business initiative focused on pro-environmental technology adoption is studied since “environmental and natural resource management, like other fields, is prone to spillover effects” (Torres, 2015, p. xi). Within this field, spillovers are defined as effects that entail cognitive, affective and/or behavioural components, transferred from one domain to another (Verfuert and Gregory-Smith, 2018; Edwards and Rothbard 2000; Xanthopoulou and Papagiannidis 2012; Truelove et al., 2014; Lauren et al., 2016; Van der Werff, et al., 2014). These may be related to the same domain (Lauren et al., 2016; Van der Werff et al., 2014) or unrelated and varying across domains (Truelove et al., 2014). For example, some argue that as people fail to perceive the similarity between different domains and hence do not behave consistently (Thøgersen, 2004), while others argue the opposite, that due to licensing effects people allow themselves to do something bad after something good due to the similarity of the domain (Chatelain et al., 2018; Merritt et al., 2010). Due to these mixed findings in terms of whether performing one pro-environmental behaviour will increase or decrease the likelihood of subsequent ones, this study investigates the spillovers of a social business initiative focused on pro-environmental technology adoption on conservation behaviours. Thus, we contribute to the social business, technological spillovers and pro-environmental behaviour strands of the literature. The use of a real social business initiative, compared to a fictitious scenario, also reduces the limitations associated with collecting data for academic research only (Manika et al., 2015).

Secondly, when it comes to social business and spillovers it is important to focus on the conduits that can connect economic activity with value for society – to ensure that the social benefits of their actions are not underestimated (Torres, 2015) and to maximise social good. Given that emotions critically affect people’s beliefs, attitudes, and decision-making in technology adoption and use contexts (Beaudry and Pinsonneault 2010), we have decided to focus the study on how emotions, as conduits, can link domains and trigger spillover behaviours. Specifically, we examine the psychological mechanism of pride, triggered by pro-environmental technology adoption (focused on energy saving), and how this specific emotion spills over to conservation behaviours within the same domain (energy saving by other means) and other domains (recycling and reusing materials). Prior research has illustrated how a positive affective framing can lead to enduring pro-environmental behaviour, even after performing a similar behaviour (Chatelain et al., 2018), but it has not investigated specific discrete emotions - other than guilt, which is a negative one (Ha and Kwon, 2016). Our research provides evidence that social businesses can use appeals to pride to promote their products and maximise their social goals. Our findings indicate that pride activates subsequent conservation behaviours after the adoption of a pro-environmental technology product, thus increasing social good.

We first review the literature on social businesses and spillovers, followed by the pro-environmental behaviour and spillovers literature, while outlining the novel technology examined in this paper (given our social business context), the pro-environmental technology adoption and conservation behaviour literature, and lastly we review literature on the psychological mechanism of pride, in order to ground our hypothesised model. The proposed model, which was empirically tested, synthesises three sets of variables, namely, technology adoption and intention to purchase the environmentally friendly technology, pride

and conservation behaviours. The methodology, including a description of the novel technology focused social business initiative used in this research, follows. Based on the results, theoretical and practical recommendations that advance the social business, technology adoption spillovers and pro-environmental behaviour literature are discussed. The paper concludes with limitations and future research directions.

2. Literature review

2.1. Social businesses and spillovers

Social business is not about maximising profits, but value for society (Gold et al., 2020). A famous example of a social business is TOMS shoes and its “one for one” concept, which promises to deliver a pair of free shoes to a child in need for every pair being sold. TOMS’s primary objective was to help people, “while running a for-profit business” (Naeini et al., 2015). Reports note that TOMS “has provided more than 35 million pairs of shoes to children in 70 countries across the world” (Naeini et al., 2015). TOMS as a social business is a self-sustaining organisation that sells shoes not only to make a profit for its owners, but primarily to serve society (Yunus et al. 2020). Social businesses, like TOMS, implicitly capitalise on the idea of spillovers, to contribute to diverse socio-economic and ecological issues to achieve their primary aim, which is to serve society.

As already defined above, a spillover is the within-person or within-entity transference of cognitive thoughts, affect/emotions and/or actions/behaviours from one domain to another (Verfuert and Gregory-Smith, 2018; Edwards and Rothbard 2000; Xanthopoulou and Papagiannidis 2012; Truelove et al., 2014). For example, the associated positive feelings (affective spillover) from the “one for one” donation for every pair of TOMS shoes bought may even lead consumers to perceive the product (i.e. the shoes) as being of higher quality than competitors who do not make similar donations, due to this transference of positive psychological state associated with the donation (Chernev and Bair, 2015) from the brand/company to the product (shoes). The spillovers can also be behavioural, for example, buying TOMS shoes due to the “one to one” donation may also encourage, or not, individual donations to good causes. Spillover outcomes can be beneficial or harmful, encouraging engagement or disengagement with a subsequent behaviour (Nilsson et al., 2017), and promoting better performance or interfering with performance (Edwards and Rothbard 2000; Hanson et al., 2006; Pierce et al., 2016).

Positive spillovers are based on the notion that one behaviour can positively influence another behaviour (Truelove et al., 2014, Lu et al., In Press). Social businesses implicitly capitalise on spillovers and their positive effects, as noted earlier in the introduction. However, research on how to leverage spillovers to allow social businesses to meet their goals has been scant (in addition to the need to avoid negative spillovers, which would hinder progress towards the social business’s goals). This paper focuses on pro-environmental technology spillovers within a social business context and investigates how pride resulting from pro-environmental technology adoption, as a tool to leverage positive spillovers, spills over to conservation behaviours.

2.2. Pro-environmental behaviours and spillovers

Given that this paper examines pro-environmental technology spillovers within a social business context, it is imperative first to review the literature on pro-environmental behaviour spillovers. The potential for spillovers to increase the reach of pro-environmental campaigns, including those promoting pro-environmental technologies, as a cost-effective and nonintrusive way of promoting beneficial behavioural change is of great interest to policymakers and social businesses (DEFRA, 2008; Thøgersen and Crompton, 2009). Prior literature reports both positive and negative spillover effects in the context of pro-environmental behaviour. Table 1 provides a selective summary of pertinent studies.

Sintov et al. (2019) found that composting as a waste management practice can spill over into energy and water saving. Similarly, Liu et al. (2021) offer evidence that a goal-setting intervention aimed at electricity-saving can spill over to water-saving, with a reduction of 15% in the group of users who set electricity-saving goals by themselves. In addition, Xu et al. (2018) found household waste separation can spill over to domestic energy consumption. In contrast, it has been shown that negative spillovers are also possible and that, for example, using reusable shopping bags provided a “moral license” to behave unsustainably by using plastic straws (Truelove et al., 2014). Overall, results are mixed in terms of how one pro-environmental behaviour (PEB) affects subsequent PEBs, and prior literature has indicated that the reason behind this variability is the extent of the similarity between initial and subsequent pro-environmental behaviours and how this similarity affects subsequent behaviour (e.g., Thøgersen, 2004; Truelove et al., 2014; Chatelain et al., 2018).

Some argue that the extent of similarity moderates the intensity of spillover effects (Truelove et al., 2014), as people may fail to perceive the similarity between different sets of behaviours and hence not behave consistently (Thøgersen, 2004). In other words, engaging in one pro-environmental behaviour (PEB, e.g., recycling paper) would lead to engagement in another pro-environmental behaviour (e.g., recycling plastic), as long as the similarity between the two is perceived by the individual (i.e., the greater the similarity the more likely they are to engage in subsequent behaviour). This is due to the fact that people want to behave consistently (Thøgersen, 2004), and the likelihood of spillover effects in a PEB context is higher when individuals hold strong personal norms for PEB (Thøgersen and Ölander 2003). However, others like Chatelain et al., p.8 argue the opposite: individuals “*would be less likely to show a second PEB after having performed a first PEB if the two behaviors were perceived as similar, compared to when behaviors were not similar to each other*”. This is due to licensing effects, when people allow themselves to do something bad after doing something good (Merritt et al., 2010).

Even though the two views are contradictory in terms of whether or not similarity is good or bad for PEB, research on pro-environmental technology adoption spillovers is scant and hence conclusions cannot yet be drawn. The novel technology considered in this research (given our social business context) is a new solar photovoltaic/thermal (PV/T) system. The system innovatively combines PV and T technologies (previously separate systems were only available), and has higher overall energy efficiency, lower costs, and better monitoring and control settings than existing systems. The product can be used for space heating, hot water and power supply. The system is useful for various types of building, including multi-storey buildings, offices, and country houses, and has multiple environmental benefits due to saving energy through higher efficiency of the system and reduced energy costs. The aim of this technology is to reduce CO² emissions. A prototype was developed by a team of engineers at a UK University in 2019 with a view to taking the product to the Chinese market in the near future.

We examine the purchase intentions for this energy saving technology as the first PEB and study whether feelings of pride (grounded on generating positive spillovers) associated with this technology adoption might spill over into subsequent conservation behaviours (the subsequent PEBs). Our paper argues that the more similar the initial PEB (relevant to the technology adopted) is to subsequent PEBs, the less likely it is that people will engage in subsequent PEBs, as people allow themselves to do something bad after doing something good (as per Chatelain et al., 2018; Merritt et al., 2010). We further argue that this effect is due to an increase in feelings of pride associated with the technology adoption (i.e., first PEB). In support of our arguments, we investigate the psychological mechanism of pride as a mediator between pro-environmental technology adoption and subsequent conservation behaviour.

2.3. Pro-environmental technology adoption and conservation behaviour

The acceptance and use of technologies can bring significant benefits at both organisational and individual levels, e.g. improved performance, efficiencies and convenience (Foley Curley, 1984; Sharda et al., 1988). Therefore, understanding the underlying factors that motivate users to engage with technologies has long motivated researchers to examine the willingness of users to accept novel and innovative technologies (Davis, 1989). amongst the various models proposed in the literature, the Technology Acceptance Model (TAM) has held a prominent position. Its parsimonious and its comprehensive nature has made it possible to apply the TAM model to a wide range of contexts, receiving validation in various applications (Ma and Liu, 2004). For example, the list of applications has also included sustainable energy (Huijts et al., 2012), which is relevant to pro-environmental technology adoption.

Davis’s (1989) TAM consists of two core variables measuring user motivation: perceived usefulness (PU) and perceived ease of use (PEOU), which directly or indirectly affect the outcome variables: attitude towards use (ATU) and behavioural intention to use (BI), which then influence the actual system use (USE) (Davis et al., 1989; Marangunić and Granić, 2015). PU is defined as “*the degree to which a person believes that using a particular system would enhance his or her job performance*”, whereas PEOU is defined as the “*degree to which users feel that using information technology does not require physical or mental effort*” (Davis, 1989). The reliability and validity of PU and PEOU have been demonstrated in abundant research (Chin and Todd, 1995; Venkatesh and Davis, 2000). Davis indicated that PU and PEOU have a direct impact on BI without being mediated by usage attitude, whilst ATU can also independently contribute to the prediction of BI. Similarly, Lee et al. (2012) demonstrated that these two variables are widely considered to be vital determinants in explaining ATU and BI (Abdullah and Ward, 2016). The development of TAM over the years has made significant theoretical and practical contributions, not just in the information system domain, but within technology research more broadly.

Technology spillovers have also been investigated to some extent. Lu et al. (in press) have found spillover effects from using the Internet to the Internet of Things (IoT). Their results suggest that emotions, well-being, and the overall value experienced in Internet usage significantly spill over into the users’ behavioural intention to use IoT. Also, a longitudinal study supported the positive spillover of active learning and transformational leadership from online games to real-life work under the condition of enhanced game performance (Xanthopoulou and Papa- giannidis, 2012). In addition, products’ functional, economic, emotional, and social values have been reported to spill over into other service subsystems, and vice versa, which in turn may affect loyalty and the perception of value by consumers (Arne et al., 2017). However, when it comes to the effects of pro-environmental technology adoption (the first PEB investigated) spillovers at the individual level, there is a dearth of research.

In relation to the subsequent PEB investigated in this paper, we consider the classification of conserving behaviours proposed by Ones & Dilchert (2013) as potential spillover outcomes. Conservation behaviours are categorised as low-intensity, low uncertainty and low individual cost behaviours (Ciocirlan, 2017), and are envisaged as extensions of household pro-environmental behaviours, but can also be applied within workplace contexts. These behaviours are relevant to our analysis as the technology considered is meant to be used across household and workplace contexts, and can increase the potential social benefits for the environment. Specifically, we focus on three conserving behaviours and distinguish between behaviours within the *same domain* – e.g. reducing energy use - and *different domains* – e.g. reusing plastic bottles and containers or recycling, which are more and less similar, respectively compared to the first behaviour. By examining one similar and two less similar subsequent behaviours, we aim to further advance the spillover literature on pro-environmental behaviour (i.e., to examine whether similarity increases or decreases the potential for spillovers),

Table 1
Selective Spillover Literature: Positive and Negative Effects.

Reference	Focus	Methods	Results
Thøgersen and Ölander, 2003	Investigating the spillovers of environmental-friendly behaviours to more areas of the consumption pattern.	Three-wave panel study (survey) of consumers.	Few modest size positive spillovers (i.e., environment-friendly conduct between behavioural categories). Negative cross-lagged effects (i.e., environment-friendly behaviour reduces the propensity to behave in an environmentally friendly way in other areas). The likelihood of spillover is marginally but significantly higher when respondents give high priority to <i>universalism</i> or hold strong personal norms for environment-friendly behaviour.
Tiefenbeck et al., 2013	Examining whether or not environmental campaigns trigger cross-domain adoption of additional environment-friendly behaviours (positive spillover) or reduced engagement elsewhere.	Field experiment focused on net performance of multifamily residences through daily water and weekly electricity consumption data of apartments.	Weekly feedback on water consumption lowered water use, but increased electricity consumption, compared with control subjects.
Lanzini and Thøgersen, 2014	Investigates environmental-friendly behavioural spillovers and the use of monetary inducements versus verbal praise.	Field experiment with university students (control condition and two experimental groups: financial compensation and incentives or verbal encouragement and praise). Shopping diaries and surveys before and after the intervention were used.	Positive spillover from “green” purchasing (mostly low-cost) to other pro-environmental behaviours. The monetary inducement had a stronger effect on “green” shopping than verbal encouragement and praise. No differences were found in the strength of the spillover effects of a monetary inducement versus verbal encouragement and praise on other environmental behaviours.
Truelove et al., 2014	This theoretical paper reviews prior literature and provides a unifying theoretical framework on pro-environmental behaviour spillover based on the Decision Mode theory.	Theoretical paper	Different decision modes for initial and subsequent behaviour lead to positive, negative, or no spillover. Internal or external attribution of the initial pro-environmental behaviour matters. Similarity between initial and subsequent environmental behaviours moderates spillover effects.
Van der Werff et al., 2014	Examining biospheric values and past behaviour as antecedents of environmental self-identity, which in turn increases the likelihood of a range of environmental behaviours.	Door-to-door longitudinal survey and experimental methods via online surveys.	Biospheric values and past environmental behaviour influence environmental self-identity, related to subsequent environmental intentions. Environmental behaviour can be promoted by reminding people of their past actions as this increases one’s environmental self-identity.
Karmarkar and Bollinger, 2015	Investigates how shopping with reusable grocery bags might alter other elements of consumers’ in-store behaviour.	Experimental methods using scanner panel data from a single California location of a major grocery chain and controlling for consumer heterogeneity.	Bringing one’s own bags increases purchases of not only environmentally friendly organic foods, but also indulgent foods. Competing goals and store policies are moderate effects.
Steinhorst et al., 2015	Examines monetary framing (savings in Euros) versus environmental framing (savings in CO ₂) on electricity saving behaviour and spillovers on further environmental behaviour.	Field experiment with a control group (no information) and two framing conditions: monetary versus environmental.	Positive spillover on climate-friendly intentions, beyond electricity saving was found in the environmental framing condition only (and mediated by personal norms and self-efficacy), while no effect was found for monetary framing. Promoting environmental behaviours out of self-interest can discourage positive spillover on further pro-environmental behaviour.
Ha and Kwon, 2016	Investigates whether or not recycling spills over to green apparel purchases. Environmental concern and anticipated guilt are examined to explain the nature of the spillover process.	Online survey	Environmental concerns mediate the spillover of recycling on green apparel purchases. Anticipated guilt does not moderate the spillover effect.
Trulove et al., 2016	Investigates the extent to which performance of one environmental behaviour spills over to increase or decrease support for environmental policies, taking into account political affiliation.	Survey of university students randomly assigned via situational manipulations to either recycle a water bottle, throw the bottle in the trash, or a control condition.	Democrats indicated a negative spillover effect mediated by environmental identity: i.e., were less supportive of the green fund than those in the control condition. Neither Republicans nor Independents displayed spillover.
Thomas et al., 2016	Examines if a Single-Use Carrier Bag Charge produces ‘spillover’ effects to other pro-environmental attitudes and behaviours.	Understanding Society Survey.	Increased use of own bags was linked to increases in six other sustainable behaviours, but these were minimal due to the lack of external motivation to change behaviour.
Carrico et al., 2018	Examines spillovers by first asking participants to engage in a difficult environmental behaviour, reducing red meat consumption, for either health or environmental reasons. Monetary donation to an environmental organisation was used as the subsequent behaviour was examined.	Online survey with experimental groups.	The green behaviour condition indicated no spillover effect, while the health behaviour condition indicated negative spillovers i.e., they were less likely to donate relative to controls. Environmental behaviour increases environmental concern, which in turn increases likelihood of donation.
Chatelain et al., 2018	Investigating if mental bookkeeping of past behaviours limits environmental behaviours after	Experiments using fictitious scenarios with participants reading campaign messages framed affectively neutral or positive/negative and	Similarity of the behaviours reduces willingness to engage in subsequent environmental behaviour.

(continued on next page)

Table 1 (continued)

Reference	Focus	Methods	Results
Peters et al., 2018	having performed similar ones; and the role of affect in this context. Examines whether the adoption of smart energy technologies, such as electric vehicles (EVs), promotes consistent sustainable energy behaviours; by investigating motives such as environmental, financial and technology reasons.	investigating the effect on subsequent behaviour after having performed the first one. Online survey with consumers.	Positive affect increases spillover and mitigates negative spillover driven by behavioural similarity. Environmental reasons strengthen the spillovers; while for financial and technology reasons there was no relationship between EV adoption and other environmental behaviours.
Xu et al., 2018	Examines how household recycling interventions (information campaign versus monetary incentives) indirectly affect household electricity consumption.	Three-year objective panel data were used.	Positive spillover for the informational campaign. Negative spillover for the monetary incentives. Positive spillover decreases over the years more than the negative one.
Van Der Werff, and Steg, 2018	Tested whether emphasizing monetary benefits of pro-environmental behaviour are less likely to strengthen environmental self-identity than emphasizing the environmental benefits.	Four experiments were conducted.	Environmental self-identity is not easily influenced by emphasizing different types of benefits of behaviour. Hence, spillover behaviour is not easily promoted or inhibited.
Fanghella et al., 2019	Investigates if environmental self-identity generates positive spillovers for environmental policy making.	Online, incentive-compatible experiments.	Past pro-environmental actions strengthen environmental self-identity, but fail to promote subsequent pro-environmental decisions. Negative spillovers exist amongst subjects who engage less in pro-environmental behaviours.
Lauren et al., 2019	Investigates three spillover mechanisms: self-identity, self-efficacy, and contribution ethic; between engagement in household behaviours to intentions to perform other environmental behaviours.	Online survey with university students assigned to experimental conditions (high versus low past behaviour).	Self-identity was associated with increased private- and public-sphere intentions. Contribution ethic was not associated with decreased intentions, but with increased public-sphere intentions. Self-efficacy did not influence intentions.
Sintov et al., 2019	Examines whether composting, a relatively difficult behaviour, results in spillover to household waste prevention behaviours (e.g., food, energy, and water waste prevention); while testing cognitive accessibility as a new mediator in the spillover process.	Longitudinal field experiment with structural intervention (i.e., kerbside organic waste bins) and procedural information.	Cognitive accessibility partially mediated the positive spillover of composting and other (energy and water waste) prevention behaviours.
Capstick et al., 2019	Assessed the beliefs that may underpin spillover processes as held by individuals themselves, or to measure these directly	Developed a survey-based instrument that was deployed in 7 countries.	Observed higher levels of endorsement of compensatory beliefs compared to extant research and higher levels of endorsement of novel items assessing catalysing beliefs. Also made methodological contributions with regards to measurements.
Nash et al., 2019	A study of subjective self-reflections on individuals' experiences of pro-environmental behavioural spillover in three countries.	A qualitative, cross-cultural study (Brazil, China, and Denmark)	Only half of participants overall who were questioned recalled spillover effects. Certain spillover effects were reported more in some cultures than others.
Tyers, 2020	Studied international student migration as a potential site for pro-environmental behaviour change	Qualitative focus groups	Host country social norms can create change without requiring normative engagement with sustainability. Behavioural change will not endure after short-term migration without supportive social norms and where there are barriers to pro-environmental behaviours in the home country.
Truelove and Nugent, 2020	Utilized a guilt appeal to encourage reducing straw use, testing for spillover effects to a wide range of household and travel behaviours, as well as for related policies.	Longitudinal survey.	Reducing plastic straw use related to increasing nontargeted eco-behaviours but did not correlate with changes in policy support. Guilt appeal did not relate to changes in behaviours or policy support.

while also contributing to the technology adoption spillover literature given that the first PEB examined is technology-based (i.e., energy saving technology), and examine the role of pride in spillovers.

2.4. The role of pride in spillovers

The overwhelming body of literature trying to integrate emotions into technology acceptance models uses the TAM (Venkatesh and Davis 2000; Bagozzi et al., 2016; Wu and Wang, 2005) or an extended version of the TAM (Venkatesh and Bala, 2008; Lee et al., 2012) as a theoretical basis. Emotions were integrated in these models mostly as antecedents of perceived ease of use (Beaudry and Pinsonneault, 2010) or antecedents of attitude towards adoption (Read et al., 2011; Huijts et al., 2012), but very few made a direct link between emotional experience and usage intentions or actual use of technology (Kim and Lennon 2013; Lu et al.,

2019, Lu et al., in press). Nor have many authors investigated a possible moderating role of emotions (Lu et al., 2019). Past literature has also considered the possible occurrence of emotions at different points in time (Stam and Stanton, 2010): elicited before, during and after a technology is introduced. In this study, we investigate emotions after a technology is introduced to examine their spillovers, given our social business context.

In addition, most technology-related studies have looked at emotions at a very general level rather than considering discrete emotions. Their focus has mainly been on positive and negative affects or a diffuse experience of pleasure or happiness with the technology (Lu et al., 2019). One exception to this trend is the research by Beaudry and Pinsonneault (2010), who looked at four different emotional experiences: excitement, happiness, anger, and anxiety. Discrete emotions, which vary on cognitive dimensions, have distinct influences on behaviour

(Baumeister et al., 2007; Frijda, 2005; Roseman et al., 1994) and, hence, further research is needed on discrete emotions as a result of technology adoption, rather than a division of emotions based on valence only.

This study focuses on pride as an emotion triggered as a result of technology acceptance variables (i.e., after a pro-environmental technology is acquired by the customer). Pride is a positive emotion elicited when we appraise something positively that we perceive as something we have caused ourselves through our behaviour (Tracy and Robins, 2007). In this respect, pride provides a boost to self-image (Tracy and Robins, 2007). The literature has identified important cultural differences in the experience of pride (Eid & Diener, 2001). Specifically, since pride is a self-relevant emotion, determined by the availability of positive information about the self, it is considered to vary cross-culturally as people's self-concept changes in different cultures (Eid & Diener, 2001; Tamir et al., 2016). Specifically, pride would be considered less acceptable in a collectivistic country like China than in an individualistic context like the US or the UK (Eid & Diener, 2001). At the same time, however, there is a significant variability within each country on the experience of pride (Eid & Diener, 2001) and there are different forms of this emotion (Liu et al., 2014; Tracy and Robins, 2007). In this study, since pride is linked to a virtuous, energy efficient technology, we focus on *authentic pride*, which concerns the positive feelings linked to a personal achievement (Tracy and Robins, 2007). This is differentiated from *hubristic pride*, which is, instead, a feeling of superiority and presumptuousness (Tracy and Robins, 2007). Feelings of authentic pride are important in collectivistic cultures like China because they offer the opportunity for social coordination toward the achievement of collective outcomes (Tamir et al., 2016; Liu et al., 2014). This is also supported by evidence on the use of pride expressions in social context as a way to maximize group cohesion (van Osch et al., 2016).

Past research shows that pride is essential for consumers in terms of progressing towards their personal goals (Manika et al., 2017; Hofmann and Fisher, 2012; Patrick et al., 2009). Thus, social businesses can help consumers achieve their individual personal goals, through generating feelings of pride after purchasing the social business product, while maximising their own end goals (i.e., social good). Hence, the current study examines pride as a discrete emotional experience (generated from intentions to adopt pro-environmental technology affected by PU, PEOU, and ATU) and its role in self-regulatory (conservation) behaviour (Patrick et al., 2009; Tracy and Robins, 2007) based on the contextual inferential processes shaping the emotional experience and its consequences (Salerno et al., 2015; Manika et al., 2017). Even though intentions are not the same as actual behaviour (a limitation of our paper), literature on pro-environmental technology adoption spillovers remains scant and hence we contribute to this body of work. Moreover, there is a reasonable level of relationship between the two and increases in intentions translate, to some extent, into behavioural change (Webb and Sheeran, 2006). The connection between intentions and behaviours is especially relevant in our context, since the adoption of a costly, energy-related innovation is likely to be a type of volitional behaviour for which intentions are a meaningful construct (Davis, 1989). Also, by using a real social business initiative, compared to a fictitious scenario, we reduce the limitations associated with collecting data for academic research only (Manika et al., 2015). Finally, intentions appear to be a relevant construct in this research given the prominent use of this research in the technology adoption literature (Davis, 1989). Based on the aforementioned, and taking into account TAM variables, we hypothesise that:

H1. Intentions to purchase the environmentally friendly technology will have a positive and significant relationship with feelings of pride.

Past studies have shown that pride has a positive effect on self-regulatory behaviours (Manika et al., 2017; Antonetti and Maklan, 2014; Boezeman and Ellemers, 2008; Hofmann & Fishbach and Dhar,

2005; Fisher, 2012; Salerno et al., 2015; Wilcox et al., 2011; Williams and DeSteno, 2008), such as the conservation behaviours examined within this study, due to its ability in helping consumers resist temptation (Manika et al., 2017; Hofmann and Fisher, 2012; Patrick et al., 2009). Based on this line of thought, engaging in one PEB (i.e., adopting the technology-based pro-environmental product) when feelings of pride are generated implies that individuals would be more likely to engage in a subsequent PEB, as they want to behave consistently. Hence, we hypothesise that:

H2. Feelings of pride will have a positive and significant relationship with all conservation behaviours.

However, past research also shows that pride is a double-edged sword (Manika et al., 2017), as it can also hinder self-regulatory behaviour (Salerno et al., 2015; Wilcox et al., 2011). This can happen because, by providing positive information about individual behaviour, pride can lead to a relaxation of self-control processes and therefore lead to less (rather than more) pro-environmental effort (Salerno et al., 2015). This is relevant to the view grounded on licensing effects (Merritt et al., 2010), arguing that similarity between the initial and subsequent PEB reduces the likelihood of spillovers (Chatelain et al., 2018). We acknowledge this double-edge sword role of pride, to extend prior literature [which has either supported a positive or negative spillover of PEBs on other PEBs, based on the extent of similarity between the initial and subsequent PEB].

In our study we specifically investigate intentions to purchase an energy saving technology as the initial PEB and its effects on three conservation behaviours as the subsequent PEBs, and distinguish between subsequent PEBs within the *same domain* – e.g. reducing energy use (high similarity context)- and *different domains* – e.g. reusing plastic bottles and containers or recycling (low similarity context). By doing so, we argue that even though generally pride has a positive effect (H2) because of consistency, because of licensing the effect might be better in a low rather than high similarity context. Thus, acknowledging pride's double-edge sword we expect that conservation behaviour within the *same domain* as the initial PEB (i.e., energy saving) will generate more licensing effects, but when the conservation behaviour is in a *different domain* than the initial PEB there will be fewer licensing effects. This could be due to different appraisals of subsequent behaviours (Salerno et al., 2015), linked to the extent of similarity (or dissimilarity) of the conservation behaviours to intentions to purchase the energy saving technology (i.e., initial PEB).

We argue that individuals will have a lower willingness to engage in conservation behaviours of the same domain as the pro-environmental technology purchase intentions than in different domains, due to the mediating mechanism of pride. This is supported by the relevant findings of Chatelain et al. (2018), who note that positive emotions (even though they did not specifically investigate discrete emotions) can reinforce "*more enduring pro-environmental behaviour*" even when licensing effects are observed across PEBs (Chatelain et al., 2018, p. 8). Hence, the relationship between pride and conservation behaviours will remain positive and significant, but will vary in strength. Thus, we specifically hypothesise that:

H3. The strength of the relationship between feelings of pride and conservation behaviour will be greater for conservation behaviours in different domains (i.e., recycling and reusing) than in conservation behaviours that are in the same domain as the technology adoption (i.e., reducing energy).

In summary, we examine the aforementioned three hypotheses while grounding our conceptual framework on the TAM, which suggests that intentions to adopt pro-environmental technology are positively affected by PU, PEOU, and ATU. Our conceptual model (Fig. 1) thus focused on the spillover effects of intentions to adopt pro-

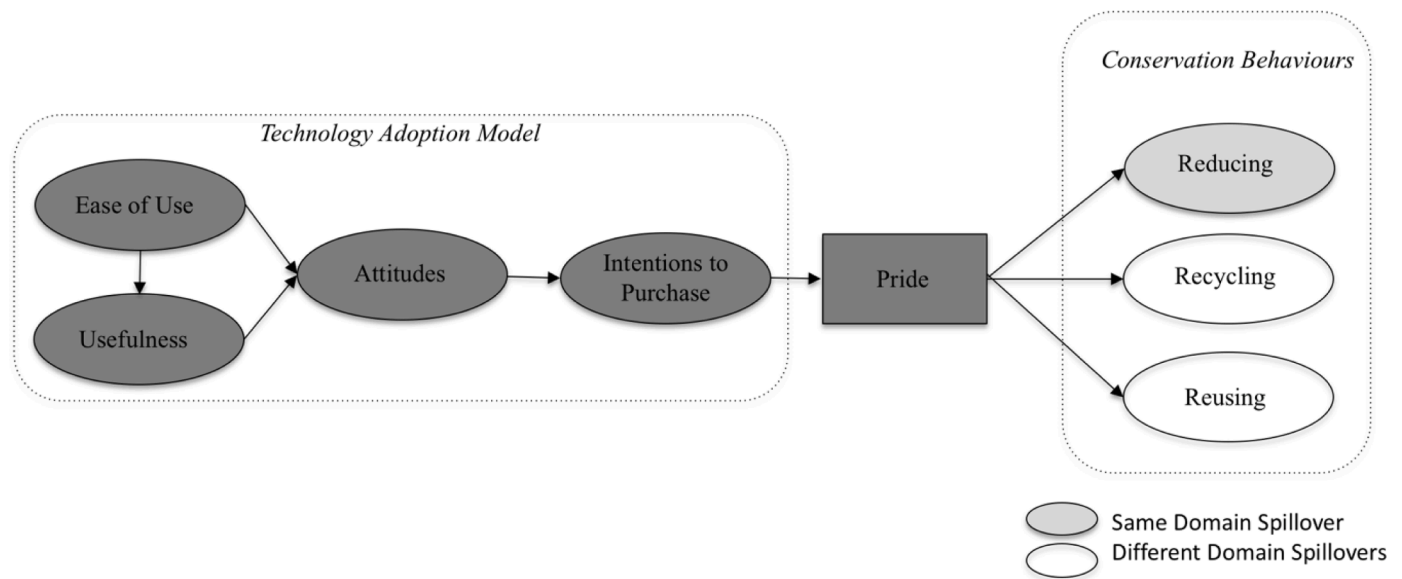


Fig. 1. Conceptual Model. Note: Gender, Age, Education, Income, Marital Status and Employment Status are used as controls for all conservation behaviours.

environmental technology on conservation behaviours through the psychological mechanism of pride.

3. Methodology

3.1. Stimuli, procedures and participants

As noted in the literature review, a new solar photovoltaic/thermal (PV/T) system, which combines PV and T technologies (previously only separate systems were available) and has higher overall energy efficiency, lower costs, and better monitoring and control settings than existing systems, is used in this research as the energy saving technology (i.e., initial technology-orientated PEB). A stimuli-driven cross-sectional online survey was adopted to test the research hypotheses. Participants' prior attitudes towards the pro-environmental technology did not affect the results because the innovative product was not yet available for sale at the time of the study. The fact that we test a real innovation increases the stimuli's believability and provides a realistic scenario to investigate the spillovers of pro-environmental technology adoption. Qualtrics was used to script and deliver the online survey. The questionnaire was first developed in English using established scales from prior literature, then translated into Chinese for the data collection in China and back-translated into English. Given that the product was to be introduced in China, Qualtrics Panels made it possible to recruit Chinese respondents who could be potential customers of the novel technology. 164 participants completed the survey. One participant was excluded from the analysis, as they did not reside in China, which was our sampling frame.

To maximise participants' engagement with the survey, we used an adapted version of the instrumental manipulation check at the beginning of the survey (Oppenheimer et al., 2009). We also used an attention-check question towards the end of the questionnaire (Meade and Craig, 2012). The sample included 163 valid participants, who also passed the attention check, and had no incomplete data. Table 2 provides the sample details.

The survey instrument exposed participants to a two-stage text-based message stimulus. The text-based message stimulus first focused on informing participants about the novel environmentally friendly product and its benefits (stage 1, baseline information part of the message stimuli): "Introducing a novel, high efficiency, low cost and building integrate-able solar photovoltaic/thermal (PV/T) system for space heating, hot water and power supply. Relative to existing PV/Ts the system offers superior performance in terms of: higher thermal and electrical efficiency,

Table 2
Sample characteristic.

Characteristic	Frequency	%
<i>Gender</i>		
Male	83	50.9
Female	80	49.1
<i>Age</i>		
18 to 24 years old	39	23.9
25 to 34 years old	49	30.1
35 to 44 years old	33	20.2
45 to 54 years old	39	23.9
55 to 64 years old	3	1.8
<i>Education</i>		
High school graduate	12	7.4
Vocational training	12	7.4
Diploma or certificate of higher education	6	3.7
Bachelor's degree	107	65.6
Master's degree	15	9.2
Doctoral degree	5	3.1
Professional degree	2	1.2
Other	4	2.5
<i>Household Income</i>		
Below RMB20000	11	6.7
RMB20000-RMB49999	12	7.4
RMB50000-RMB59999	7	4.3
RMB60000-RMB69999	4	2.5
RMB70000-RMB79999	7	4.3
RMB80000-RMB89999	4	2.5
RMB90000-RMB99999	11	6.7
RMB100000-RMB149999	26	16.0
RMB150000-RMB199999	21	12.9
RMB200000-RMB299999	26	16.0
RMB300000-RMB399999	17	10.4
RMB400000-RMB499999	11	6.7
Over RMB500000	6	3.7
<i>Marital Status</i>		
Single	52	31.9
Married	105	64.4
In a partnership	5	3.1
Prefer not to specify	1	.6
<i>Employment Status</i>		
Full-time	131	80.4
Part-time	9	5.5
Out of work (looking)	3	1.8
Student	17	10.4
Retired	3	1.8

lower cost and better monitoring and control system. The system is useful for various buildings, including multi-storey buildings, offices, and country houses. Buy this environmentally-friendly technology now!". After exposure to the baseline part of the message stimuli (stage 1), TAM variables were measured (i.e., perceived ease of use, perceived usefulness, attitudes and behavioural intentions to adopt the environmentally friendly product).

The second stage of the stimuli focused on inducing feelings of pride in relation to the adoption of the novel environmentally friendly product (stage 2, pride-induced part of the message stimuli): "The new solar photovoltaic/thermal system is not just about saving on your energy costs. As energy-related emissions are expected to increase by 70% by 2050, so do the negative consequences of climate change, including higher temperatures and a rise in the frequency of extreme weather events. Be an innovator and take pride in reducing your carbon footprint to save the environment, while reducing your energy costs. Be the first to adopt this new solar photovoltaic/thermal system!" Pride and the positive spillovers of technology adoption in the form of behavioural intentions to recycle, reduce and reuse were then measured. The survey finished with the collection of demographics, which were to be used as controls.

3.2. Measures, measurement model and common method bias

All survey items were measured on 1–7 Likert or Bipolar scales (see Table 3). Perceived ease of use and perceived usefulness scales were adapted from Wu and Wang (2005). Attitudes towards the new PV/T system were measured based on a combined scale of Bansal et al. (2005) and Nysveen et al. (2005), while behavioural intentions were based on an adapted scale from Chandran and Morwitz (2005) which focused on purchase intentions. Feelings of pride were measured using one item borrowed from Antonetti et al. (2018). Intentions to engage in pro-environmental behaviours, with regards to spillovers, were also based on the adapted scale from Chandran and Morwitz (2005).

In order to assess the measurement and structural models, a Partial Least Square (PLS) approach to Structural Equation Modelling (SEM) was adopted, which represents an alternative paradigm to the use of covariance-based SEM (Hair et al., 2012, 2012). The former approach is preferable because the research has an exploratory focus. PLS-SEM estimation is more resistant to potential violations of normality than covariance-based SEM (Hair et al., 2011). Moreover, PLS-SEM is preferable when dealing with smaller sample sizes (Hair et al., 2011). SmartPLS 3.0 and 5000 bootstrap resamples were used for the measurement and structural model (Hair et al., 2011).

The measurement model, including the controls, performed sufficiently. As illustrated in Table 3, all indicators yielded Composite Reliability (CR) equal to or above 0.94 and Average Variance Extracted (AVE) equal to or above 0.65, indicating good reliability (Hair et al., 2011). Table 4 displays the root square of the AVE for all constructs, as well as correlations between latent variables, demonstrating that the Fornell-Larcker criterion (Fornell and Larcker, 1981) was respected. In addition, the heterotrait-monotrait ratio was below one (highest value of 0.88) (Henseler et al., 2015). Overall, these results suggest good discriminant validity across both samples. Table 4 also shows the means and standard deviations of our constructs.

Since some of the variables were measured in a cross-sectional design, the data could have been potentially affected by Common Method Bias (CMB). To minimise potential effects of this bias all scales were randomised and participants were reminded frequently of the anonymity and confidentiality of their responses (Podsakoff et al., 2003). A Harman's test was conducted via Exploratory Factor Analysis with no rotation. One factor accounted for 32.84% of the variance, compared to four factors accounting for 62.8% of the variance. This analysis suggests that CMB was not a threat to the interpretation of the results in this study.

Table 3
Measurements.

Constructs	Loadings
Perceived Ease of Use of the new PV/T system (CR =0.90, AVE = 0.75)	
<i>Please describe the extent to which you agree with the following statements.</i>	
The new solar photovoltaic/thermal system looks easy to use.	.89
I would find it easy to get the new solar photovoltaic/thermal system to do what I want it to do.	.88
Interacting with the new solar photovoltaic/thermal system does not require a lot of my mental effort.	.83
Perceived Usefulness of the new PV/T system (CR =0.93, AVE = 0.82)	
<i>Please describe the extent to which you agree with the following statements.</i>	
Using the new solar photovoltaic/thermal system can improve my property's overall energy efficiency.	.91
Using the new photovoltaic/thermal system is useful to reduce my energy costs.	.92
Using the new photovoltaic/thermal system's monitoring and control panel is useful to me.	.89
Attitudes Towards the new PV/T system (CR = 0.94, AVE = 0.65)	
<i>Please describe your attitudes towards the new solar photovoltaic/thermal system.</i>	
Bad: Good	.85
Foolish: Wise	.79
Harmful: Beneficial	.72
Unpleasant: Pleasant	.86
Unfavourable: Favourable	.84
Negative: Positive	.77
Uninteresting: Interesting	.77
Dislike: Like	.84
Irritating: Not Irritating	.82
Intentions to Purchase the new PV/T system (CR = 0.95, AVE = 0.79)	
<i>Please describe your intentions to purchase the new solar photovoltaic/thermal system.</i>	
Unlikely: Likely	.92
Improbable: Probable	.93
Impossible: Possible	.89
Uncertain: Certain	.83
No Chance: Certainly	.88
Pride	
<i>Thinking about your feelings after reading the previous message:</i>	n/a
To what extent do you feel good about yourself?	
Intentions to Recycle (CR = 0.96, AVE = 0.82)	
<i>Please describe your intentions to reduce your carbon footprint by recycling:</i>	
Unlikely: Likely	.91
Improbable: Probable	.91
Impossible: Possible	.92
Uncertain: Certain	.90
No Chance: Certainly	.89
Intentions to Reduce Energy Consumption (CR = 0.96, AVE = 0.84)	
<i>Please describe your intentions to reduce your carbon footprint by reducing your energy consumption.</i>	
Unlikely: Likely	.91
Improbable: Probable	.93
Impossible: Possible	.92
Uncertain: Certain	.94
No Chance: Certainly	.90
Intentions to Reuse Plastic Bottles and Containers (CR = 0.96, AVE = 0.84)	
<i>Please describe your intentions to reduce your carbon footprint by reusing plastic bottles and containers.</i>	
Unlikely: Likely	.91
Improbable: Probable	.92
Impossible: Possible	.92
Uncertain: Certain	.94
No Chance: Certainly	.89

4. Findings

Fig. 2 presents the estimated structural model. The predictive power of our model is acceptable, as the antecedents explain a moderate amount of variation in the endogenous constructs (Hair et al., 2011), related to spill overs of pro-environmental technology adoption. To assess the predictive relevance of the models, the Stone-Geisser's Q² (Geisser, 1974) was calculated. All Q² values were higher than zero for all endogenous constructs, supporting the predictive relevance of the model for all latent constructs.

Table 4
Descriptive Statistics, Correlations and Fornell-Larcker Criterion.

Constructs	M (SD)	1	2	3	4	5	7	8	9	10	11	12	13	14	15
1. Perceived Ease of Use	5.41 (0.99)	0.86													
2. Perceived Usefulness	5.67 (1.04)	0.76**	0.92												
3. Attitudes	5.97 (0.83)	0.58**	0.66**	0.80											
4. Intentions to Buy	5.34 (1.27)	0.52**	0.55**	0.67**	0.88										
5. Pride	4.67 (1.45)	0.27**	0.20**	0.25**	0.18*	1.00									
7. Intentions to Recycle	5.84 (1.11)	0.49**	0.55**	0.55**	0.38**	0.24**	0.90								
8. Intentions to Reduce	5.83 (1.08)	0.53**	0.59**	0.53**	0.38**	0.19*	0.74**	0.91							
9. Intentions to Re-use	5.80 (1.18)	0.57**	0.55**	0.44**	0.28**	0.28**	0.68**	0.66**	0.91						
10. Gender	1.51 (0.50)	0.02	0.03	-0.12	-0.16	-0.02	-0.21	-0.17	-0.14	1.00					
11. Age	3.50 (1.15)	0.12	0.12	0.16*	0.13	0.24**	0.07	0.15	0.09	0.05	1.00				
12. Education	4.88 (1.30)	0.13	-0.04	0.02	0.05	0.07	0.00	-0.05	0.12	-0.01	0.10	1.00			
13. Income	12.90 (5.16)	0.22**	0.14	0.13	0.18*	0.10	0.15	0.10	0.18*	0.04	0.10	0.20*	1.00		
14. Marital Status	1.74 (0.62)	0.11	0.06	0.08	0.12	0.08	0.04	0.02	0.01	0.08	0.39**	0.21**	0.23**	1.00	
15. Employment	1.62 (1.44)	-0.07	0.02	-0.03	-0.05	-0.26	0.01	0.00	-0.04	0.02	-0.27	-0.33	-0.21	-0.36	1.00

** $p < 0.01$. * $p < 0.05$.

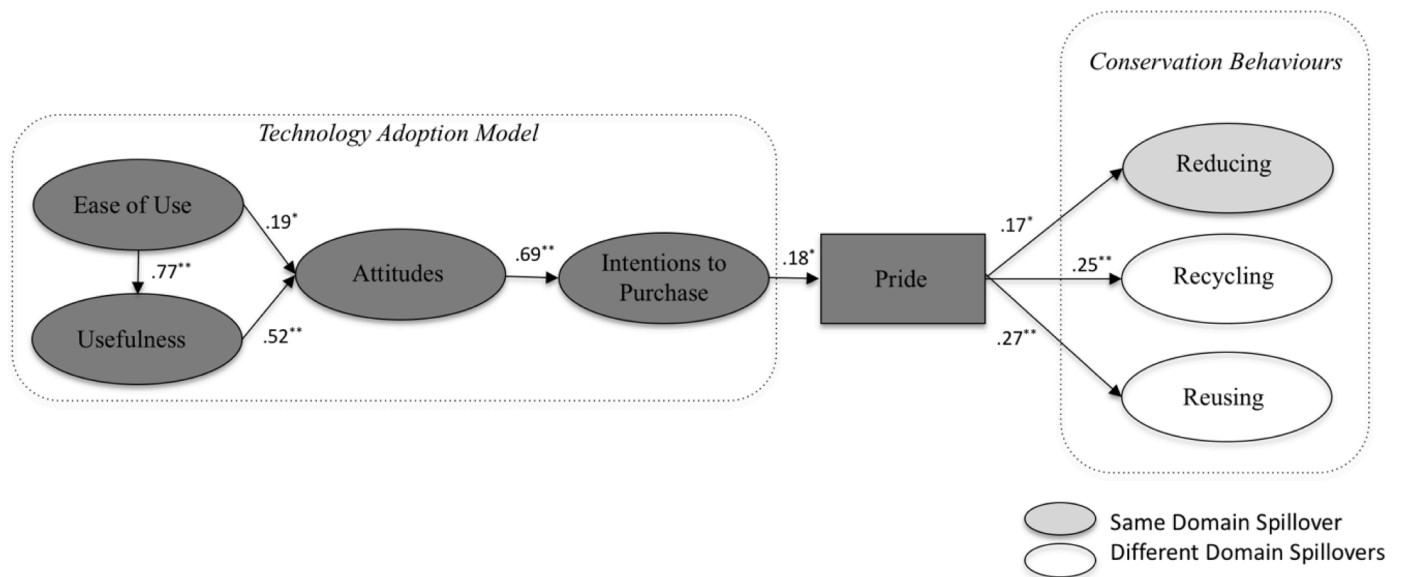


Fig. 2. PLS-SEM Results. *Notes:* Recycling $Q^2 = 0.19$; Reusing $Q^2 = 0.10$; Reducing $Q^2 = 0.7$. Gender, Age, Education, Income, Marital Status and Employment Status were used as controls for all conservation behaviours. The only significant relationships were: income and reusing (0.17, $p < .05$); gender and recycling (-0.22, $p < .01$); gender and reducing (-0.18, $p < .05$).

Pro-environmental technology purchase intentions, affected by TAM variables, have a positive relationship with feelings of pride (0.18, $p < .05$), which in turn spills over to positive conservation behaviours (Reducing: 0.17, $p < .05$; Recycling: 0.25, $p < .01$; Reusing 0.27, $p < .01$), supporting H1 and H2 respectively. The strength of the relationship between feelings of pride generated by intentions to purchase the environmentally friendly technology and conservation behaviour spillovers is greater for recycling and reusing (different domain), than in reducing energy (same domain). This is supported by the size of the parameters between pride and each of the conservation behaviours,

which suggests that behaviours of different domains have a stronger relationship with pride than the behaviour of the same domain. Furthermore, the predicted Q^2 values support the differential effect across behavioural domains. The Q^2 values of the different domain spillovers (Recycling $Q^2 = 0.19$; Reusing $Q^2 = 0.10$) are greater than the same domain spillover (Reducing $Q^2 = 0.7$), which implies that the independent variables included in our module (Fig. 2) better predict first recycling, followed by reusing, and lastly reducing conservation behaviours. Thus, the results support H3.

5. Discussion

This study proposes and tests a psychological mechanism (i.e., pride) that allows social businesses to maximise their primary goal of contributing value to society, while meeting financial goals, through the leverage of spillovers (Bell, 2003; Teasdale, 2010; Yunus et al., 2010; Engelke et al., 2015; Torres, 2015). Spillovers are implicitly connected to social businesses who strive to be self-sustaining through financial activity (selling products/services), while contributing to diverse socio-economic and ecological issues (Yunus et al., 2020) – i.e., the intentional spillover of the economic activity. To ensure that the social benefits are not underestimated (Torres, 2015), but also maximised, social businesses can utilise pride to their advantage. Our findings suggest that pride triggered by pro-environmental technology adoption, namely the social business initiative focused on energy saving, spills over to conservation behaviours within the same domain, i.e. energy saving by other means, as well as different domains, i.e. reusing plastic and containers or recycling. The social business examined is therefore not only able to reduce CO₂ emissions through the adoption of a novel technology, but also maximise its social good by encouraging other pro-environmental behaviours (i.e., conservation behaviours) through the psychological mechanism of pride. In addition, generating feelings of pride associated with pro-environmentally friendly technology adoption, through a stimulus (in our case the pride-inducing message – stage 2), enhances the labelling of the user as being an environmentalist; which in turn has been found to enhance his/her environmental self-identity (Geng et al., 2019). All these additional benefits beyond a reduction of CO₂ emissions through the adoption of a novel technology underscore the usefulness of leveraging spillovers for social businesses, as these can augment environmental and social impacts e.g., beyond what can be achieved with the social business technology product by itself. This study is one of the first, if not the first, to study spillovers and social businesses. Future research should expand such endeavours that investigate spillovers and try to answer the following research questions: When and how can social businesses leverage spillovers to achieve their goals? What types (behaviour-based instrumental, the value-based instrumental and the affective ones) of spillovers are useful to social businesses to achieve their goals?

While our study only assesses one specific spillover, in one research context, the mechanism proposed promises to operate through feelings of pride in any other social business that can elicit positive feelings in the relevant user. Take the example mentioned above of TOMS. A consumer supporting this brand is likely to experience feelings of pride akin to those experienced by participants in this research (Antonetti and Maklan, 2014), leading to a spillover mechanism. Consequently, it is possible that any social business has a possible spillover effect although the nature, size and target of these behaviours will need to be considered in future research. We suggest that social businesses might lead to spillover effects in the same domain. For example, since TOMS focuses on helping children in developing countries, the spillover might be focused on charity donations and/or support for developmental organizations rather than in the environmental domain as observed in this research. Furthermore, we expect that there might be boundary conditions to these spillover effects since we know that they do not always materialize (e.g., Sintov et al., 2019) and sometimes they can even be negative (e.g., Fanghella et al., 2019).

Emotional reactions related to social businesses also provide a fruitful arena for further research. Appeals to pride can be leveraged by social businesses as by definition they focus on the social good and as per our findings pride-inducing messages enhance the impacts of the adoption of pro-environmental technology. Our study also complements the work on spillovers of Chatelain et al. (2018) – investigating emotional reactions – and Ha and Kwon (2016) – investigating guilt as a discrete emotion – related to spillovers. In this paper, the psychological mechanism of pride has been examined as a positive effect on self-regulatory conservation behaviours (Antonetti and Maklan, 2014;

Boezeman and Ellemers, 2008; Hofmann and Fisher, 2012; Williams and DeSteno, 2008), but we also acknowledge its double-edged sword role (Manika et al., 2017) in relation to licensing effects. Relevant to the latter, the relationship between pride and conservation behaviours varied in strength, depending on whether the subsequent behaviour is in the same domain (high similarity context; reducing energy) vs. different domain (low similarity context; reusing materials and recycling). Thus, we extend (1) the pro-environmental spillovers literature (Chatelain et al., 2018; Ha and Kwon, 2016) and (2) the literature on pride. We find that conservation behaviour within the *same* domain as the initial PEB would generate more licensing effects, but when the conservation behaviour is in a *different* domain to the initial PEB there will be fewer licensing effects, due to the mediating mechanism of pride. Future research should investigate: What positive appeals (pride and beyond) can be leveraged by social businesses to achieve their goals? How might emotional reactions towards social businesses (positive vs. negative) hinder or enable their success?

Furthermore, we examined pride in the Chinese context. While there is significant evidence that pride is a universal emotion (Tracy and Robins, 2007), the experience of pride and its dimensions can change cross-culturally and even within the same country (Eid & Diener, 2001; Liu et al., 2014). Further research is therefore needed to replicate the spillover mechanisms described in this research. Future studies should explore the significant heterogeneity found within this country – as far as the experience of positive emotions is concerned (Eid & Diener, 2001). It would be interesting to find whether pride is effective with all groups and/or whether subgroups of Chinese consumers exist that are more or less sensitive to this emotion. Moreover, Western, individualistic samples should also be studied in future research to rule out potential differences. The cultural specificity of pride might also influence the messaging used by corporations to elicit pride. There is some evidence that Chinese consumers are more likely to feel pride in behaviours that are anticipated to bring out positive collective (rather than only individual) outcomes (Liu et al., 2014; Stipek, 1998). This is an important insight that can be leveraged by social businesses, like the one examined in this research, that are able to deliver positive social outcomes.

6. Limitations

As with all research, this paper suffers from limitations that should be addressed. One of the first limitations is the use of intentions as a proxy for behaviour. The literature has shown that there is a gap between intentions and actual behaviour (Ajzen and Fishbein, 1980). This paper uses technology adoption intentions only as an antecedent of pride (discrete emotion examined). Given that intentions are not actual behaviour, not only might individuals not end up purchasing the pro-environmental technology, but also actual behaviour may enhance further feelings of pride rather than relying on intentions, as actual behaviour requires greater commitment than intentions and constitutes greater progress towards an end goal. Future research should examine actual technology adoption behaviour and how this influences pride and the spillovers on conservation behaviours. Another limitation of the present study is the generalisability of the results. Given the small sample size and restriction to Chinese consumers, it is important to note that further research is needed on technology spillovers and their value for social businesses, to generalise the results of this research.

CRedit authorship contribution statement

Danae Manika: Conceptualization; Methodology; Investigation; Formal Analysis; Writing – Original Draft; Writing – Review & Editing; Funding Acquisition. **Paolo Antonetti:** Conceptualization; Writing – Original Draft; Writing – Review & Editing. **Savvas Papagiannidis:** Conceptualization; Writing – Original Draft; Writing – Review & Editing. **Xiaojing Guo:** Investigation; Data Curation; Project administration.

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