

THE ENTREPRENEURS' PROPENSITY TO ADOPT ELECTRIC MOBILITY IN THE SHORT FOOD SUPPLY CHAIN

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ABSTRACT

In the last years, Short Food Supply Chain (SFSC) has gained relevant attention among the consumers, for its characteristics of environmental, economic and social sustainability. At the same time, recently some doubts has been raised about the environmental negative impacts that also SFSC is causing, despite the intrinsic "local" label. In particular, the reference is on the transport system and related CO₂ emissions of SFSC that undermines the full achievement of environmental concerns. To deal with this challenge, electric vehicles (EVs) are seen as a viable and very promising alternative. Starting from these considerations, this study investigates the propensity of entrepreneurs operating in the SFSC to introduce EVs inside their business. In particular, in order to understand which factors affect this behaviour, the Theory of Planned Behaviour and New Ecological Paradigm have been used. Results show that farmers with high attitudes towards the shift from carbon transport systems to electrical ones, and which are more sensitive to ecological and environmental sustainability issues, are more willing to adopt EVs in their business. This is the first work that investigates the intention of local producers, operating in the SFSC, to introduce an EV for the freight transports, providing interesting theoretical, managerial and political implication, and addressing scholars towards future researches.

Keywords: Local Food Supply Chain; Electric Vehicles; Farmer's market; Theory of Planned Behaviour; New Ecological Paradigm.

INTRODUCTION

Since the end of the nineties, Short Food Supply Chain (SFSC), a term coined by Marsden *et al.* (2002), has received considerable attention by scholars as a direct consequence of the increasing interest of consumers towards this alternative sale channel (Migliore *et al.*, 2015). The SFSC, as legally defined by EU Regulation 1305/13, is able to reach goals of "sustainable agriculture". However, the environmental dimension of the sustainable character of the SFSC has recently raised some doubts, in particular as regard its contribution to the reduction of CO₂ during the transportation phase (Schmitt *et al.*, 2017). Indeed, if from a hand, if compared to Mass Food Supply Chain, the reduction in travelled km can be

obvious, on the other hand, reflections are growing in relation to the effective contribution of CO₂ reduction at overall local level, on the route where usually entrepreneurs involved in the SFSC operate. Some scholars are attempting to investigate this environmental impact theoretically referring to the food miles concept, initially linked to the overall food supply chain (Paxton, 1994), so from cultivation phase to final distribution one, more recently linked much more explicitly to carbon accounting and the climate change debate (Schmitt *et al.*, 2017; Kissinger, 2012; Coley *et al.*, 2011; Kemp *et al.*, 2010; Smith and Smith, 2000). This is, of course, part of the recent scientific debates on climate change with particular attention on the transport system impact both of goods and people. In this domain, starting with the EU Directive 2014/94/EU on alternative fuels, in 2016 the EU Commission set a new target for road transport according to which within 2050 a reduction of 60% of CO₂ emissions can be achieved. A challenge that is aimed to ensure overall sustainability but at the same time responding to the transport forecasts according to which within 2050 transport will increase of 42%. Then, if we can't stop the transport growth we can reduce the related CO₂ emissions, changing/converting the transport means power systems to greener ones. In this context, the more promising option is the Electric Vehicle (EV) (both hybrid and 100% versions currently available in the market), and towards which the main National, Regional and Local policies around Europe are investing (from public transport means to private and commercial final use).

According to these recent trends, this study investigates the propensity of entrepreneurs operating in the SFSC to introduce EVs inside their business, with a view of overall sustainability. In particular, in order to understand which factors affect this behaviour the Theory of Planned Behaviour (TPB) and New Ecological Paradigm (NEP) have been used. The sample has been selected from the entrepreneurs participating in the farmer's markets of the city of Palermo, in Sicily (Italy). To the best of our knowledge, the present work, which is an exploratory study, is the first one aimed at investigating the behaviour of entrepreneurs operating in the SFSC against the opportunities to introduce an EV for the freight transports to reach farmer's market.

LITERATURE REVIEW

Short Food Supply Chain

At the base of SFCS there is the creation of a trust relation between producers and consumers, usually identifiable in a face-to-face interaction, allowing thus a direct relation that in the global FSC is totally absent. According to the definition of short food supply chains developed by Marsden *et al.* (2002), SFSCs have capacity to "resocialize" or "re-spatialize" food, thus allowing consumers to make value-judgements about foods. Authors make clear that "it is not the number of times a product is handled or the distance over which it is ultimately transported which is necessarily critical, but the fact that the

product reaches the consumer embedded with information”, enabling the consumer to confidently make connections and associations with the place/space of production, “and potentially the values of the people involved and the production methods employed” (Marsden *et al.*, 2002).

The scientific literature has then put into lights further factors and implications attributable to SFCS and directly linked to sustainability goals: economic, social and environmental impacts. As for the SFSC economic impact, authors convene in attributing rural development and economic regeneration to these models (DuPuis and Goodman, 2005; Renting *et al.*, 2003), to stimulate local employment opportunities (Roininen *et al.*, 2006), with multiplier effects (Henneberry *et al.*, 2009). SFSC is also characterized by the ability to increase income for producers (Pearson *et al.*, 2011; Feagan and Morris, 2009). In social terms, several investigations showed the ethical dimension characterizing SFSC. In this meaning, Ilbery and Kneafsey (1998) found that producers often act as “profit sufficers” rather than “profit maximizers”, putting at the top of producer’s intention their contribution to the wellbeing of the community, rather than aspiring to capital maximization (Jarosz, 2008).

As for the environmental impacts evaluation linked to SFSC, several contrasting opinions are currently under discussion at scientific level. Indeed, if from a hand scholars highlighted the positive impacts of SFSC in terms of food miles and carbon footprint reduction (Van Hauwermeiren *et al.*, 2007), other authors support a thesis according to which when in the SFSC local products are stored and purchased out of season, these products may have a greater carbon footprint than non-local goods (Edwards-Jones, 2010; Cowell and Parkinson, 2003). At this regard, the food mile literature opens interesting debates. Originally conceptualized in the nineties (Paxton, 1994), this concept was first linked to the overall food production process (from the cultivation phase to the distribution one). More recently, however, food miles have been linked much more explicitly, and in some cases solely, to carbon accounting and the climate change debate (Schmitt *et al.*, 2017; Kissinger, 2012; Coley *et al.*, 2011; Kemp *et al.*, 2010; Smith and Smith, 2000). This change has led to the shift of the food miles argument away from sustainable agriculture production systems *per se* to food distribution and retailing and, in particular, to the GHG linked to transport. At this regard, Coley *et al.* (2011), looking to the carbon emissions of several delivery systems compared to direct sales for vegetable box schemes, found that customers who have to drive more than 6.7 km in a round trip to buy their organic vegetables have higher levels of emissions when compared to the emissions involved in the system used by the large distributors. Ideas regarding the environmental benefits of local food in terms of the reduction in food miles and GHGs need to be rethought and better reformulated, as stressed by Schmitt *et al.* (2017), which support the argument that despite locally processed food products can be defined as more sustainable, not because of lower carbon footprint, but for localness criteria (e.g. identity, know-how, size and governance) rather than distance concerns. Giving the relevance of consumer’s role in

contributing to the spreading of more sustainable food purchasing practices, a need to further work on the increase of an overall awareness about that is also suggested by Kemp *et al.* (2010), which results suggest that the “food miles” argument has not had great influence on the behaviour of supermarket shoppers.

Electric vehicles adoption

The substantial emission reductions necessary to achieve climate change reduction targets require, among others, a de-carbonization of transport. EVs are seen as a viable and very promising alternative (Hao *et al.*, 2017), especially if electricity is generated in a clean manner (Egbue *et al.*, 2017). To date, no scholars have ever attempted to assess the propensity of entrepreneurs operating in the SFSC in introducing EVs into their business activities. The majority of works carried out in this last decade, in fact, has been addressed to assess the main drivers for the uptake of EV, mainly referring to private traditional car owners and early adopters, with the aim to investigate customer behaviours, intentions and preferences about support schemes (Santos and Davies, 2019; Ramos-Real *et al.*, 2018; Quak *et al.*, 2016; Rezvani *et al.*, 2015; Bunce *et al.*, 2014; Plötz *et al.*, 2014). Santos and Davies (2019), resuming the opinions of 189 respondents, represented by stakeholders and experts, found that 75% of respondents state that the development of charging infrastructure is on the top of the priorities for a mass EVs deployment, followed by purchase subsidies (68%), pilot/trial/demonstrations (66%) and tax incentives (65%). As Ramos-Real *et al.* (2018) suggest, geographic dimension of the area concerned by EVs introduction is also a relevant factor, together with the necessity that end users effectively know technical data on EVs so as to be able to do an aware choice. Authors, studying the feasibility of EVs introduction in the Canary Islands underline how the small size of the territory dictates driver mobility routines, as the short average travel distance reduces the effects of range anxiety. Furthermore, authors underline that willing to pay for an EV purchase is positively correlated with some factors, among others, education attainment and strong environmental concern (Ramos-Real *et al.*, 2018). As for range anxiety limit, defined as one of the main problem facing drivers interested in buying EVs, a recent study carried out in UK found that the initial range anxiety would fade overtime since knowledge and confidence developed through driving for an extensive period of time (Bunce *et al.*, 2014). The profile of consumers has been a topic widely examined, with special attention on EVs early adopters (Rezvani *et al.*, 2015; Plötz *et al.*, 2014), highlighting social, economic and demographic characteristics. Another literature branch investigated the role of the EV in the urban city logistic schemes examining the feasibility of using electrically powered vehicles in urban freight transport from a carrier’s perspective (Quak *et al.*, 2016).

CONCEPTUAL FRAMEWORK

With the aim to investigate the propensity of entrepreneurs operating in the SFSC to introduce EVs inside their business, we started from the consideration that the intention to adopt a specific behaviour depends on individual attitudes towards a given behaviour, subjective norms, and perceived behavioural control (Ajzen, 1991), to which other authors add the role played by environmental concerns (Dunlap *et al.*, 2000). A conceptual framework, based on the Theory of Planned Behaviour and the New Ecological Paradigm, has been used in order to meet this purpose.

Theory of Planned Behaviour

The Theory of Planned Behaviour (TPB) (Ajzen, 1991), an extension of the Theory of Reasoned Action (TRA) (Ajzen and Fishbein, 1980), is based on the premise that individuals make logical and reasoned decisions to engage in specific behaviours, by evaluating the information available to them.

According to the TPB model, an individual's intention to perform a behaviour is a function of that individual's attitude toward the behaviour, social norms and perceived behavioural control. Attitude towards the behaviour (ATT) is conceived by Ajzen and Fishbein (1980) as an "*individual's positive or negative evaluation of the performance of a particular behavior*". A person, who believes that valuable positive outcomes would result from performing the behaviour, will have a positive attitude toward it. According to the TPB model, it must be said that the more favourable attitude toward a behaviour, the more possibility that the individual will perform that certain behaviour (Ajzen, 1991). The second dimension, named Social Norm (SN) is a social pressure exerted on an individual to engage in a particular behaviour (Ajzen and Fishbein, 1980). Indeed, individuals intend to perform a behaviour when they feel that the people who are important for them confirm that behaviour (Shin and Hancer, 2016). Perceived Behavioural Control (PBC) consists in individuals' perceived ease or difficulty of a particular behavioural performance (Ajzen, 1991). This component emphasizes the extent to which that an individual perceives a behaviour to be under his/her volitional control (Fielding *et al.*, 2005). Behavioural control is related to beliefs about the presence of factors that may further or hinder the performance of behaviour (Ajzen, 2002; Ajzen and Madden, 1986). The above mentioned dimensions, affect the Intention (INT) which is an "*individual readiness to perform a given behaviour*" and is recognized as the motivation which is necessary for engagement in a particular behaviour. The intention is the most substantial predictor of behaviour and is assumed to be an immediate antecedent of this (Ajzen, 2002).

A review of literature shows that the TPB has long been successfully used to investigate a wide variety of farmers' intentions such as: adoption of innovations and technologies (Adnan *et al.*, 2019), sustainable practices (Zeweld *et al.*, 2017; Menozzi *et al.*, 2015; Fielding *et al.*, 2008), adaptation to climate change (Arunrat *et al.*, 2017; Dang *et al.*, 2014), engagement in pro-environmental activities

(Van Dijk *et al.*, 2016). Despite the general usefulness of the TPB to identify and understand different behaviours of farmers, some scholars have attempted to enhance the predictive power of the TPB model, by including additional constructs to strengthen the predicting power of the model. Rezaei *et al.*, (2018), extending the TPB model including the two constructs of moral norms and knowledge recognized an increased robustness and explanatory power of the proposed framework in predicting farmer's intention in engaging in farm food safety. Positive remarks as regard the robustness of an extended TPB have been also expressed by Giampietri *et al.* (2018). Authors, adding the trust construct to the original TPB, agree on the greater performance of the model in predicting interviews' intention to purchase food in SFSCs. Employing different constructs allowed Menozzi *et al.* (2015) to better investigate the consumers' intention to purchase traceable chicken and honey in France and Italy. Adding new variables (e.g. habits, trust, past behaviour and socio-demographics) to the original TPB demonstrated how an extended TPB model can be of relevant importance in better predicting behaviours in two different countries. Adnan *et al.* (2019) concluded their work highlighting that if paddy farmers have more concern towards the environment, they will have more attraction towards adopting sustainable agricultural practices. Results have been achieved thanks to the employment, also in this case, of an extended TPB model, including new variables linked to external and economic factors.

To date, far too little attention has been paid to extend the TPB model by incorporating additional constructs mainly pertaining to the environmental sphere, with a particular reference on NEP. To this we add that, despite the growing literature on farmer's behaviours through the application of TPB, no studies have put the attention on the behaviours of entrepreneurs operating in the SFSC as regard the electric mobility intention for managing freight transport.

New Ecological Paradigm

In investigating the environmental attitude of an individual, the environmental psychology can be of relevant support. This last refers to a specific tendency expressed by evaluating a particular object related to the environment with some degree of favour or disfavour (Kaiser *et al.*, 2011). The New Ecological Paradigm (NEP) scale (Dunlap *et al.*, 2000), is considered as the most widely used environmental attitude instrument today. Originally proposed in 1978 by Dunlap and Van Liere (1978), this theory has been revised in 2000 (Dunlap *et al.*, 2000). The NEP scale consists of 15 Likert-scale items, which are intended to measure five core components of individuals' environmental concern: (1) limits to economic growth, (2) anti-anthropocentrism; (3) the fragility of nature's balance; (4) human exemptionalism; and (5) the possibility of potentially catastrophic environmental changes or eco-crises affecting people (Dunlap *et al.*, 2000).

The NEP has been used in previous studies to investigate consumer attitudes about the risks of genetically modified food (Hall and Moran, 2006), to stress how environmental concern affects marine species conservation (Pienaar *et al.*, 2015), to study pro-environmental orientation differences between people living in city areas and rural districts (Berenguer *et al.*, 2005).

For what in our knowledge, this is the first time that the NEP scale is used to assess the environmental orientations of entrepreneurs operating in the SFSC.

METHOD AND DATA

To achieve the aim of the present work, an empirical analysis has been carried in the city of Palermo (Sicily, Italy) during March 2019, involving local Farmer's associations managing the farmer's markets in the Province of Palermo, among which Coldiretti group, currently leading the label "Campagna Amica", the Association "Pianeta Mercati", and the Association "Contadini in Villa".

To investigate the entrepreneurial propensity to introduce EVs inside their business for the distribution of agro-food products, a questionnaire has been developed and organized in four sections. In the first section, main data on firm characteristics have been detected, such as principal production, headquarter, and production methods. The second section collected socio-demographic characteristics of respondents, including specifications about eventual sons/grandchild in their family nucleus and membership to environmental associations. The third section contained specific questions aimed at gathering knowledge about the transport system characteristics of each sampled firms as well as questions attempting to quantify yearly distances travelled to reach selling points. The behaviours towards the EV introduction into their business has been measured through section four, which included a set of questions based on the TPB, appropriately modified according to the research field. The last section, the fifth, has been devoted to acquire data on individuals' environmental concern using questions based on the NEP scale. Questions pertaining to section 4 and 5 included a five points Likert scale. As for the TPB, the questionnaire items were defined, taking into account Ajzen's conceptual and methodological considerations for constructing a TPB questionnaire (Ajzen, 1991) and the previous works carried out in similar field where a 5 point response format has been used (Giampieri *et al.*, 2018; Rezaei *et al.*, 2018; Adnan *et al.*, 2019; Arunrat *et al.*, 2017). While, for the NEP scale, the selection of a 5 point Likert scale has been decided following the results of a meta-analysis on works employing NEP scales, executed by Hawcroft and Milfont (2010), who highlighted that all studies, like the Dunlap *et al.* (2000) one, used a Likert scale and the 83.45% of the sample the one with five-point response format. As a consequence, respondents were asked to specify their opinion respecting each item, using a five-point Likert-type scale from 1 to 5 as follows: 1=strongly disagree; 2=disagree; 3=neither agree nor disagree; 4=agree; and 5=strongly agree.

Giving the innovative nature of the research question and hence of the sample to be involved in order to gain initial primary data regarding this particular SFSC issue, a convenience sample method has been used. Following the research inputs suggested by Creswell and Plano Clark, (2010), according to which employing a convenience sample allows collecting data only from reliable people, in our case really adopting this business model. To this scope, the small sample was made up by 42 entrepreneurs, involved in the SFSC and participating in the farmer's markets of the Palermo Province. All firms have headquarters in rural areas, around 20-100 km far from Palermo city. Questionnaires have been administered directly in loco, visiting farmer' markets. Taking into consideration the scarceness of data collected, solely descriptive statistical analysis was performed, which importance is worth to be considered for future research in this area.

Table 1. Drivers about the introduction of electric mobility in the farm based on the TPB (range 1 to 5)

	Average value
Attitudes	3.49
In my opinion, issues related to climate change are a critical factor, and awareness and knowledge of electric mobility must be increased among farmers as a tool to reduce CO2 emissions.	4.19
In my opinion, the introduction of electric mobility in my farm will contribute to increasing the green image of my company	3.79
In my opinion, the introduction of electric mobility in my farm is a good and wise choice	3.67
I believe that the introduction of electric mobility in my farm is a fundamental step to make the agri-food supply chain more sustainable	3.64
In my opinion, the introduction of electric mobility in my farm is useful and valuable	3.48
Social Norms	2.67
In my opinion, more and more farmers will adopt sustainable practices in the future linked to distribution through the use of electric vehicles	3.33
The people, whose I appreciate opinions, will approve my choice to introduce electric mobility into my farm	3.07
Other farmers I know believe that electric mobility is an important issue and they are engaged in its introduction to their farms	2.26
People whose I appreciate opinions, ask me to introduce electric mobility in my farm	2.00
Perceived Behavioural Control	2.74
The adoption of electric mobility in my farm depends exclusively on me	3.17
I am quite confident in my abilities and skills for introducing electric mobility in my farm	3.14
The introduction of electric mobility in my farm is quite simple and I can easily manage it	2.71
The tangible and intangible resources in my farm are sufficient for the correct management of the distribution of food products through electric mobility	2.48
I am quite aware and informed about the support policies for electric mobility (e.g. incentives, tax systems) and I do not need any other information about it	2.21
Intention	3.52
I would like to introduce electric mobility in my farm in the future	3.52

RESULTS

Table 1 presents the main factors affecting entrepreneurs to introduce or not EVs in their business. Results show a propensity of the interviewees towards the shift from carbon transport systems to

electrical one. On the whole, findings show a greater number of interviewees who are convinced of their intention to introduce electric mobility in the future for the distribution of agro-food products (3.52). The intention to introduce electric mobility in the short chain is mainly linked to the shared opinion among the interviewees that this choice could contribute, on the one hand, to reducing CO2 emissions (4.19) and, on the other hand, to improve the image of the company on the market (3.79). Respondents believe that the strong orientation towards sustainable choices will also concern the introduction of EVs (3.33), and this is in line with the awareness that corporate choices are shared by people (3.07). However, what emerges from the study is a lower awareness, among the interviewees, of the ability to control this new transport system, as emerges from the values obtained, which are all around average values. Furthermore, the results show that, on average, internal resources are not sufficient for an efficient management of this new transport system that can be implemented by the company (2.48).

Table 2. New Ecological Paradigm Scale Items (range 1 to 5).

	Average
Reality of limits to growth	4.60
The Earth has many natural resources if we only learned to exploit them	4.71
We are close to the limit of the maximum number of people that the Earth can bear	3.50
The Earth is like a spaceship with very limited rooms and resources	3.26
Possibility of an eco-crisis	4.21
Humans are seriously abusing the environment	4.60
If things continue to go on like now, we will soon experience a serious ecological disaster	4.05
The so-called ecological crisis has been greatly exaggerated	2.79
Fragility of nature' balance	3.59
When humans interfere with nature, they often produce disastrous consequences	4.50
The balance of nature is very delicate and easily disturbed	4.12
The balance of nature is strong enough to cope with the impacts of modern industrialized nations	2.79
Anti-anthropocentrism	2.94
Plants and animals have the same right to exist as humans	4.48
Humans were destined to rule the rest of nature	2.31
Humans have the right to change the natural environment to meet their needs	2.26
Rejection of exemptionalism	2.21
Despite our abilities, humans suffer the laws of nature	3.98
Human ingenuity will ensure that we do not make the earth unlivable	3.29
Humans will learn how nature works so that they can control it	2.07

Empirical evidences demonstrate that the environmental proactive behaviour of entrepreneurs, in this case associated to the introduction of EVs, is related to the different facets of the possible ecological visions on the nature. Table 2 shows how respondents agree on average on the five NEP ecological visions. In particular, results highlight a great awareness among respondents of the importance of protecting natural resources (4.71), which are exploited by human beings (4.60), causing disastrous

consequences (4.50). Based on mean responses to each of the NEP items, it seems that respondents tend towards a good enough pro-ecological worldview, proved by the positive agreement for *“Possibility of an eco-crisis”* (4.21 out of five) and *“Fragility of nature’ balance”* (3.59 out of five). An opinion further confirmed by the strong support recognized to the item *“Humans are seriously abusing the environment”* (4.60 out of five). The assumption of the presence of a pro-ecological opinion is also linked to the shared disagreement about *“Anti-anthropocentrism”* (2.94) and *“Rejection of exemptionalism”* (2.21).

In order to better understand the behaviour of entrepreneurs participating to the SFSC and their propensity to introduce the electric mobility, respondents have been divided into two groups, one including the entrepreneurs who have a high intention to introduce EVs in their business and respondents who have a low propensity. In particular, individuals with a high propensity to change the carbon transport system with the electrical one show a more positive attitude towards that behaviour (4.15), completed by positive scores in the effects from social norms, with a score that is over the neutral position (3.38), and a better Perceived Behavioural Control (3.55). Furthermore, they also show particular concern about the resources scarcity (4.79), the possible ecological catastrophes that can derive from an inappropriate exploitation of the environment and its resources (4.41), and the delicate balance of the nature (3.85).

An interesting fact arising from the study is that entrepreneurs who frequently participate in the farmers’ markets, since their corporate headquarters is located near the same markets show a greater willingness to introduce electric mobility in the SFCS.

Table 3. Profile of the sample considering two groups: individuals, respectively, with high and low intention to introduce electric mobility in the farm

	Respondent age	Distance from the market	Annual participation in the markets	Attitudes	Social Norms	PBC	Limits	Eco-crisis	Balance	Anti-anthro	Anti-exempt
High intention	25.54	13,346.15	139.38	4.15	3.38	3.55	4.79	4.41	3.85	3.00	2.00
Low intention	44.02	23,513.45	96.76	3.19	2.34	2.38	4.52	4.13	3.47	2.92	2.31
Total sample	38.30	20,366.43	109.95	3.49	2.67	2.74	4.60	4.21	3.59	2.94	2.21

This study also wanted to highlight the potential measures desirable for farmers to encourage the spread of electric mobility. Findings suggest that measures aimed at covering direct costs related to electric mobility (non-repayable grant, incentive for the relief of the insurance premium, and eco-

incentive for the purchase of EVs) are the most preferred by entrepreneurs. On the contrary, support tools related to the reduction of costs associated with circulation are less appreciated by interviewees.

Table 4. Support tools suggested to politicians in order to encourage the introduction of electric mobility in the farms

Support measures	No.	%
Non-repayable grant for the purchase of the electric vehicle	29	29.29
Incentive for the relief of the insurance premium	24	24.24
Eco-incentive for the purchase of an electric vehicle that covers more than 30% of the cost of the vehicle	17	17.17
Eco-incentives in cases where the purchase of one or more electric vehicles takes place between several farms in order to use them in a shared way	14	14.14
Exemption from paying the parking ticket in public areas (e.g. blue strip parking)	6	6.06
Exemptions from the payment of the fee to access the restricted traffic areas of all the municipalities	6	6.06
Right of movement in the lanes reserved for public transport	3	3.03

DISCUSSIONS

The main interesting findings of the present work and worth to be discussed, also for their managerial and political implications, originate from the profiling of interviewees we did according to the high or low intention showed. High social norms scores present in the group with higher intention towards introducing an EV in their business, suggest how in the presence of people with higher environmental concern, also the social context from which they belong to play a relevant role in pushing towards more and more sustainable practices. The higher value of PBC in this group, compared to the score of the overall sample, suggests how social norms and environmental awareness do the difference in the possibility of introducing greener transport means. A similar correlation has been found by Giampieri *et al.* 2018 where, analysing through TPB, the intention of consumers to buying in SFSC, found that the more consumers attitudes are positive toward SFSC and the more the people who are important for them approve the behaviour, the more the PBC increase.

However, entrepreneurs operating in the SFSC most concerned about the environment and the delicate balance of natural ecosystems are those who have the higher intention to reduce their environmental impact through sustainable means of transport, such as electrically powered vehicles. This evidence is also supported by the literature on EVs, according to which Ramos-Real *et al.*, (2018) found that early adopters are, among other features, the one with strong environmental concern. To this we add that by taking into account the social and geographical context from which this group belong to, that is rural area, our findings are in line with Berenguer *et al.* (2015) according to which, applying the NEP scale, authors found that people living in the rural context present more attitudes of environmental responsibility and greater consistency on expressing behavioural intentions compatible with the protection of the environment compared to people living in city areas.

The greater propensity to introduce EVs by entrepreneurs who frequently participate in the farmers' markets closest to the corporate headquarters is probably linked to what in the literature on EV is called

“range anxiety”, according to which the more the distance to be travelled the more the reticence to purchase an EV, as a consequence of fears (not technically founded) linked to the battery charge life and the few charging points along the route (Ramos-Real *et al.*, 2018; Bunce *et al.*, 2014).

Giving the high current market entry costs for EVs, the need for support measures is of relevance importance also for the entrepreneurs involved in the SFSC. Our results, showing a great preference for those measures mainly oriented at covering direct costs related to the purchasing of EVs, are in line with Santos and Davis (2019) which found that, despite the development of charging infrastructure is on the top of the priorities for a mass EV deployment, the main support measure necessary is the one linked to purchase subsidies.

CONCLUSIONS

This is a preliminary analysis aimed to investigate the behaviour of local producers operating in the SFSC against the opportunity to introduce an EV for the freight transports to reach farmer’s markets. Despite the small sample analysed, results are interesting because they contribute to enrich the literature on the pro-environmental behaviour linked to the debate currently open worldwide on how ensure an effective de-carbonization of transport system.

In particular, the research shows that farmers that mostly participate in the farmers’ markets and travel the shortest distance are more willing to introduce EVs for the distribution of their products. The same behaviour is highlighted in farmers whose managers and owners show high attitudes towards the shift from carbon transport systems to electrical ones, and which are more sensitive to ecological and environmental sustainability issues.

In light of this, the study provides interesting theoretical, managerial and political implications.

On the theoretical point of view the employment of an extended model of the TPB to which environmental opinions of entrepreneurs have been incorporated, further contributes to the development of the theory itself. Results show that TPB is a useful theory to investigate behaviours of the entrepreneurs operating in the SFSC as well as to know which characteristics linked to the distribution of goods are identified as main drivers for the effective introduction of EV to be intended here as the greener transport mean currently available in the market.

From a managerial perspective, the research mainly suggests farmers working in the SFSC to seriously consider the opportunity to take into account the introduction of EVs in their business, above all in those cases where distances travelled are on reduced range, so suitable for the actual battery duration. However, giving the growing societal awareness towards the transport system de-carbonization, managers should evaluate the EV purchasing as an added value of the local production model adopted to be properly communicated to consumers.

Switching to a political dimension, the majority of entrepreneurs participating in SFSC indicated as the most favourite support measure, for the introduction of EV into their business, non-repayable grant for the EV purchase. Policy makers in their political planning work should hence consider concrete measures able to provide an answer to this need that, if achieved, could allow the spread of EVs among entrepreneurs working in the SFSC. Having a look on Italy, and with particular attention on Sicily, the infrastructural charging system is ready to function as proved by the National infrastructure plan for the recharge of vehicles powered by electricity (PNIRE), approved by the Government in 2014. Following the PNIRE input, the Sicilian Regional Authority, in 2017 approved the Regional Plan for Infrastructure and Mobility (PIIM), which includes detailed measure for ensuring the electric mobility spread. In this respect, our findings could be useful for policy makers in order to plan programs addressed to promoting a more effective transport system de-carbonization among SFSC network. Taking into account that the intention to introduce electric mobility is greater among entrepreneurs who show both higher attitude for adopting proactive environmental behaviours and wider environmental awareness, an educational program aimed at the public and entrepreneurs to strengthen greater environmental awareness is desirable.

Although this study extended our understanding of farmers' intention to introduce EVs inside their business, it has likewise a number of certain limitations that need to be considered in future studies. Firstly, the present study only examines one Province of an Italian region, with a limited sample. Therefore, results could not be generalized to all farmers participating in SFSC neither in the entire country not in the overall region. Consequently, what is now needed is across-regional and/or a cross-national study involving the sample from a diverse geographic area. Secondly, the study has been performed only inside farmer' market, excluding the other alternative short supply chains. As consequent, future work should engage more entrepreneurs working in other business distribution channels of the SFSC.

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