Sustainable entrepreneurship:

Values, social networks and spatial concentration

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Abstract

Sustainable entrepreneurship is influenced by personal altruistic and egoistic values, while social networks influence the adoption of these values, especially in the restaurant sector. Due to social convergence, actors in the same social network adopt similar values, which creates a higher likelihood of sustainable entrepreneurship in some networks. It is argued that physical proximity of actors in social networks facilitates spatial concentration. A survey analysis shows that altruistic values differentiate sustainable entrepreneurs from conventional entrepreneurs. Consequently, spatial concentration was indicated using multiple spatial statistics, concluding that spatial concentration of sustainable entrepreneurship is different from spatial concentration of conventional entrepreneurship.

Keywords: Sustainable entrepreneurship (O44, 035), spatial concentration (R11), social networks (D85), entrepreneurship (L260)

1. Introduction

Increasingly, entrepreneurs show interest in starting a sustainable business or making their current business more sustainable. Where conventional entrepreneurs see a business opportunity, social entrepreneurs start a business with a societal goal in mind (Isaak, 2002). Ecopreneurs are entrepreneurs with an environmental goal in mind (Indaco-Patters, et al., 2013). In contrast to ecopreneurs and social entrepreneurs, sustainable entrepreneurs adopt both societal and environmental goals and can serve as a catalyst in the larger socio-economic transition of society towards more sustainability. They can address the market failure in conventional business entrepreneurship (Parrish & Foxon, 2009). Therefore, sustainable entrepreneurship has been introduced as a means of achieving sustainable development (Gibbs, 2009).

Sustainable entrepreneurs are purpose-driven entrepreneurs, which makes them highly committed and possibly more successful than conventional entrepreneurs (Keogh & Polonsky, 1998; Indaco-Patters, et al., 2013). The purpose of the sustainable entrepreneur to make a sustainable change happen is determined by his or her values, because values are among the main determinants of environmental behaviour (Steg & De Groot, 2007). However, not only values define an entrepreneur's purpose. Similar values, similar norms and reciprocal trust between individuals characterise social networks in which social capital is created. 'Herding' effects of social networks cause a convergence of norms, values and activities in social networks (Durlauf & Fafchamps, 2004), which indicates that networks with environmental values can become even more environmental and can give rise to a high prevalence of sustainable entrepreneurship. On the other hand, social networks that do not support sustainable values are less likely to give rise to sustainable entrepreneurship. Unsupportive social networks can be restrictive if sustainability does not conform to the norm (De Vaan, 2011). Because most social networks are based on face-to-face contact, actors in social networks are geographically proximate (Rutten, et al., 2010). For sustainable entrepreneurship, some places contain facilitating social capital, while other places contain restrictive social capital (Huber, 2009). This dispersion of facilitating and restricting social capital gives rise to differences in the spatial patterns of conventional entrepreneurship and sustainable entrepreneurship. Furthermore, it indicates spatial concentration of sustainable entrepreneurship. This can contribute to an understanding of which environments support sustainable entrepreneurship and can aid policy making for a more sustainable society. Understanding the Dutch landscape for sustainable businesses with its strengths and weaknesses can provide valuable information for policy makers, investors and future sustainable entrepreneurs.

Although sustainable entrepreneurship can be relevant in achieving sustainable development, the field of sustainable entrepreneurship is still in its infancy (Cohen & Winn, 2007). Little academic research exists on small firms and on the environments of sustainable entrepreneurs (Clemens, 2006). Furthermore, research on sustainable small and medium enterprises (SMEs) has a narrow geographical scope up until now (Aykol & Leonidou, 2015). This research aims to uncover the spatial pattern of sustainable entrepreneurship in the restaurant sector in the Netherlands to add to the scarce literature. In so doing, it answer the following research question: To what extent does value-driven sustainable entrepreneurship give rise to spatial concentration of sustainable SMEs?

2. Theory

This research focusses on sustainable entrepreneurs and their motivations to start a sustainable business. The entrepreneur according to Schumpeter (1947) does new things or does things that are already being done in a new way. The entrepreneur in a Schumpeterian sense is an innovator, who creates social value as a by-product of his or her innovation (Schumpeter, 1947). Schumpeter's view on entrepreneurship focuses on the individual. However, according to Venkataraman (1997), entrepreneurship involves more than just the entrepreneur. The presence of opportunities together with entrepreneurial persons creates entrepreneurship (Venkataraman, 1997). These opportunities can exist in the physical environment, while the entrepreneurial person is part of his or her social network. Shapero & Sokol (1982) add another element and argue that all variables shaping the entrepreneurial event are individual, social and situational. The next paragraphs describe sustainable entrepreneurship by firstly discussing individual entrepreneurship values in section 2.1, secondly by describing value mechanisms in social networks in section 2.2 and finally going into the situational aspect by discussing spatial concentration in section 2.3.

2.1. Sustainable entrepreneurship: value-driven entrepreneurship

Schaltegger & Wagner (2011) classify entrepreneurship that focuses on sustainability in four categories: ecopreneurship, social entrepreneurship, institutional entrepreneurship and sustainable entrepreneurship. The explicitly environmentally acting entrepreneurs are ecopreneurs and sustainable entrepreneurs, although social or institutional entrepreneurs could also adopt sustainability issues. Institutional entrepreneurs aim to contribute to changing regulatory, societal or market institutions, whereas social entrepreneurs aim to contribute to solving social problems and to add value to society. Ecopreneurs have explicit environmental goals (Schaltegger & Wagner, 2011). Some entrepreneurs in the sustainable restaurant sector might have similar aims as social and institutional entrepreneurs, however, the entrepreneurs with sustainability as a main goal are sustainable entrepreneurs. Although Schaltegger & Wagner (2011) define these four types of entrepreneurship as essentially different, the boundaries are fuzzy. Ecopreneurs often adopt sustainability goals, which indicates that a social and environmental goal are pursued simultaneously (Holt, 2010). Furthermore, entrepreneurship with an environmental mission has been given many names in the literature, such as green-green business, environmental entrepreneurship, enviropreneurship, green entrepreneurship and eco-entrepreneurship (Holt, 2010). Social entrepreneurship has also lacked a generally accepted definition over the past years (Short, et al., 2009). Because this research is motivated by the achievement of sustainable development, sustainable entrepreneurs are the focus of this research. However, it is most likely that this research is also applicable to other types of entrepreneurship.

The sustainable entrepreneur's main goal is societal transformation towards more sustainability, while making money is a secondary goal (Cato, et al., 2008; Daneke, et al., 2010). This focus on the altruistic goal of the sustainable entrepreneur indicates that they are different from entrepreneurs that are sustainable because of other reasons. Other entrepreneurs can adopt sustainability goals out of cost reduction, as a marketing strategy, because of strict legislation or push from institutions such as NGOs (Isaak, 2002). Schick et al. (2002) indicate that many companies indeed go green out of defence instead of having green values. Existing businesses that turn green to attract customers are often seen as 'greenwashing' businesses by consumers (Hart & Milstein, 1999). They adopt a green façade without having actual commitment to green goals. These businesses could, for example,

greenwash as a reaction to new green entrants (Hockerts & Wüstenhagen, 2010). Hart & Milstein (1999) state that these companies will not provide the large drive towards global sustainability. Because of a lack of commitment to sustainability goals, they can be expected to put minimal effort in greening once a green identity has been established or switch to a less sustainable production method once that becomes more profitable. Therefore, existing firms adopting corporate social responsibility goals or other environmental goals are not considered in this research. The focus is rather on the value-driven sustainable entrepreneur.

It is argued that the sustainable entrepreneur is a value-driven entrepreneur because altruistic values differentiate sustainable entrepreneurs from conventional entrepreneurs. Kuckertz & Wagner (2010) indicate that the influence of sustainability orientation on entrepreneurial intentions is an important determinant for sustainable entrepreneurship. According to Steg et al. (2014), biospheric values are the largest determinant of environmental behaviour and, therefore, of sustainable entrepreneurship. Furthermore, sustainable entrepreneurs are described as purpose-driven entrepreneurs (Cohen & Muñoz, 2015), their purpose being the transition of society towards more sustainability. This purpose indicates how altruistic values are the foundation for the raison d'etre of the sustainable entrepreneur.

However, altruistic social and biospheric values are differently related to environmental behaviour and need therefore be taken into account separately. Especially when a choice between an altruistic social or environmental act needs to be made, the dominance of either of these values is decisive (De Groot & Steg, 2008). Although the effect of these values is different, pro-environmental norms and behaviours are positively related to both altruistic and biospheric values and negatively to egoistic values (Steg & De Groot, 2007; De Groot & Steg, 2008). However, sustainable entrepreneurship is not only based on altruistic values, because sustainable entrepreneurs start a business out of which they aim to make a profit. Their value set consists of egoistic as well as non-egoistic values. Because of the monetary benefits from entrepreneurship, sustainable entrepreneurship might also be rewarding for individuals with dominant egoistic values. Kirkwood & Walton (2010) indicate that, besides green values, passion for their business and economic considerations such as seeing a gap in the market are important determinants for ecopreneurs, more important than for conventional entrepreneurs. This could also apply to sustainable entrepreneurship. On the other hand, conventional entrepreneurs have strong preferences for non-pecuniary (non-monetary) benefits as opposed to pecuniary benefits, such as being your own boss (Hamilton, 2000; Hitt, et al., 2011). Entrepreneurs' preference for non-pecuniary benefits result in higher levels of job and life satisfaction than non-entrepreneurs (Blanchflower & Oswald, 1998). However, Cato et al. (2008) found that sustainable entrepreneurs are less concerned with financial achievement than conventional entrepreneurs. To conclude, sustainable entrepreneurs contain a unique value set consisting of biospheric, social and egoistic monetary values. It is argued that what differentiates sustainable entrepreneurs from conventional entrepreneurs are their altruistic values. The first hypothesis of this paper is therefore:

H1: Sustainable entrepreneurship is different from conventional entrepreneurship because sustainable entrepreneurs are more driven by altruistic values.

2.2. Social networks

Although many individuals might have the value set that allows for sustainable entrepreneurship, it does not always lead to sustainable entrepreneurship. Through a set of beliefs it leads. to an ecological worldview, which leads to problem awareness and an ascription of responsibility. This can give rise to a pro-environmental norm, which is a direct cause of environmental behaviour (Stern, 2000). Besides personal pro-environmental norms, social norms are the product of shared values and norms of a social network and lead to or restrict pro-environmental behaviour (Schultz, et al., 2008). Social norms have been found to influence entrepreneurship (Meek, et al., 2010). When considering sustainable entrepreneurship in the restaurant sector, values are likely to be a combination of altruistic and egoistic values as mentioned in the previous paragraph, while awareness on the environmental and social effects of food is required to behave sustainably (Stern, 2000).

Environmental and social knowledge can be gained by information sharing between actors in a social network, which happens when there is trust and actors have similar norms and values (Durlauf & Fafchamps, 2004; Huber, 2009). When levels of trust are high and norms and values similar, social networks create social capital. Social capital can create group identity and lead to the modification of personal norms and preferences. 'Herding' effects exist, giving rise to group behaviour that is different from the individual's preferences (Durlauf & Fafchamps, 2004). Furthermore, social norms play an integral role in influencing entrepreneurial start-up (Meek, et al., 2010). Therefore, members of the social network gain similar values and knowledge and do similar activities. This effect is enhanced with more sustainable behaviour. When they start identifying themselves as sustainable persons, they are more prone to more sustainable behaviours (Whitmarsh & O'Neill, 2010) and this could stimulate sustainable behaviours of others in the network.

The importance of social networks for entrepreneurship is highlighted by Saxenian (1996), who indicates that the face-to-face social interaction between and within firms and local institutions determine entrepreneurship. The social environment and its networks can be key in the decision to start a firm (Sternberg & Litzenberger, 2004). Entrepreneurial networks are a major determinant of knowledge spill overs and social capital (Huggins & Thompson, 2015). Although knowledge spill over theory is often used to explain technological innovation, it might also be useful in explaining the spill over of environmental knowledge, or even environmental values. The local social interaction effect as described by Johnston, et al., (2005) indicates that values and knowledge are communicated locally, leading to similar behaviours. He uses the example of local voting patterns and finds that: *"Those who talk together locally, vote together"* (Johnston, et al., 2005, p. 1458). Because interactions between people occur in the places where they are most often, emulation effects occur, where neighbours act in similar ways (Johnston, et al., 2005).

Besides the positive effects of social capital on sustainable entrepreneurship, there is also a downside of social capital. There is a risk of conformity bias in tight groups, which restricts radical ideas (De Vaan, 2011). De Vaan (2011) indicates that, for a single business sector, the more social capital is present in a region, the less likely entrepreneurs are to start businesses in new industries unknown to that region. Due to value convergence and social norm creation in social networks, some types of business are considered legitimate, while others are not. If sustainable entrepreneurship is considered a radical action not in convergence with the social norm, there could be a lower incidence of sustainable entrepreneurship (De Vaan, 2011). An altruistic entrepreneur could, for instance, not be welcome in a network with dominant egoistic values.

Davidson & Wilklund (1997) state that cultural values and beliefs are important determinants of firm formation, of which one of the structural determinants is a large number of small firms. As shown above, cultural values and beliefs can give rise to similar economic activity, such as sustainable entrepreneurship. Furthermore, the restaurant sector provides a large sample of small firms, which creates a beneficial atmosphere for social capital (Boschma, 2005). Finally, social networks benefit from physical proximity. Actors get higher returns on investments in social networks when the other actors are physically close (Glaeser, et al., 2000), raising the likelihood of actors in the same social networks to be located near each other. Therefore, social networks can give rise to local or regional entrepreneurship (Westlund & Bolton, 2003). Because it can be assumed that social networks give rise to spatial concentration of entrepreneurship, the second hypothesis is:

H2: Due to the physical proximity of actors in social networks, sustainable entrepreneurship tends to concentrate spatially.

2.3 Spatial concentration

Social capital can be an important determinant for spatial concentration in the sustainable restaurant sector, because norms and values are spatially proximate, just like the social relations they are a product of (Rutten, et al., 2010). Because sustainable entrepreneurs start their business based on altruistic values, it is highly likely that they share their knowledge and values with other individuals, such as individuals working in the same industry, in other industries or other actors like consumers or university and NGO actors. Social diversity (Jacobs, 1969) and cultural amenities (Porter, 2000) have been argued to stimulate entrepreneurship. These variables vary across space and are most prevalent in cities. Furthermore, small firms, such as SMEs, are likely to lower the costs for the entering of other small firms, for instance by triggering a diversity of supplier, entrepreneurial networks, entrepreneurship culture and venture capitalists (Chinitz, 1961). Also, there are local differences in social capital (Subramanian, et al., 2003), therefore some locations could be more beneficial for sustainable entrepreneurship. As such, spatial concentration could occur and could be beneficial in the sustainable restaurant sector.

Urbanization and localization economies are discussed as determinants for regional entrepreneurship (Bosma, et al., 2008; Krugman, 1991). Localisation effects are likely to occur in the restaurant sector, because restaurants need to ensure maximum exposure, and grouping can maximise consumer interest (McCann, 1995). Also, localization economies have been found to be especially important for new ventures, such as SMEs in the restaurant sector (Bosma, et al., 2008). However, Brülhart & Mathys (2008) indicate that, except for the financial sector, localization economies mainly create congestion effects instead of economic benefits. Agglomeration economies more often have a positive effect (Brülhart & Mathys, 2008). Agglomeration economies can be part of restaurant concentration, because it allows restaurants to locate near a large market (Porter, 2000). Furthermore, knowledge spill overs in either localization or agglomeration economies might indicate spatial concentration of sustainable entrepreneurs. Based on the idea that cultural amenities partially determine clusters (Porter, 2000) and that existing knowledge can spill over and be used in new start-ups (Acs, et al., 2005; Huggins & Thompson, 2015), it can be argued that environmental knowledge and values may also exhibit a spill over effect. Because of the necessity of sector-specific environmental knowledge in the restaurant sector and because localization economies could be beneficial for the restaurant sector, the following hypothesis is tested:

H3: The spatial concentration of sustainable SMEs occurs in areas with a large share of businesses in the same sector.

3. Data collection and data analysis

The focus of this research is on SMEs in the restaurant sector. The low-tech character of sustainable restaurants is a reason for using sustainable restaurants as an indicator for spatial concentration of sustainable entrepreneurship. Sustainable restaurants, being part of the service industry, are not characterized by high-tech innovation. The lack of innovation in this sector places higher importance on values instead of technological knowledge as the product of social capital, therefore automatically controlling for the effect of technological innovation on sustainable entrepreneurship. Furthermore, Boschma (2005) indicates that a large sample of small firms creates a beneficial atmosphere for social capital and the restaurant sector in the Netherlands is a large sample of small firms.

To determine whether sustainable entrepreneurship is differentiated from conventional entrepreneurship based on the altruistic values of the entrepreneurs as hypothesized in H1, a survey was conducted among entrepreneurs in the Dutch restaurant sector. It was analysed with a binary logistic regression. The second hypothesis on spatial concentration of the sustainable restaurants was tested by a number of spatial estimates on the Dutch restaurant sector, including sustainable restaurants. These spatial estimates also provided the input for a final binary analysis, which was used to test H3 and thus determine localization effects. The following section discusses the definition of sustainable restaurants, the collection of restaurant locations and survey data and the methods used to determine spatial concentration and localization effects.

3.1. Definition of sustainable restaurants

Sustainable restaurants cater to a number of sustainable diets with different rationales. Local, seasonal, vegetarian or vegan diets are more sustainable than the average western diet in relation to greenhouse gas emissions, overfishing, deforestation, desertification, over-fertilisation and the accompanying ocean acidification, ocean dead zones and biodiversity loss (FAO, 2006; Morawicki, 2012; Garnett, 2014). Besides these mainly environmental effects, a lower meat and dairy consumption requires less fodder inputs, leaving more agricultural land for other uses, such as food for human consumption or biomass for biofuel production. Local food is an important contributor for food security and serves the purpose of increased food transparancy for consumers. Global food chains often lack transparancy, which can lead to ignorance of consumers regarding social or environmental issues caused by food production in distant areas. Consuming local food can therefore give an assurance of sustainability (Friedmann, 2007). Finally, organic food serves environmental as well as social goals of food. Organics International defines organic agriculture as *"a production system that sustains the health of soils, ecosystems and people."* (IFOAM, 2005). Because organic food is produced without synthetic fertilizers and contributes to diversity of species, it contributes to a food system that is less sensitive to pests and other shocks. Also, it has positive effects on biodiversity (Hole, et al., 2005). Lower sensitivity of the food system to shocks and higher biodiversity also promote food security.

Concluding, a vegan, organic, local and seasonal diet is the most sustainable diet, in terms of social and environmental effects. Restaurants serving local, organic, seasonal, vegan and/or vegetarian food are therefore considered more sustainable than conventional restaurants in this research.

Entrepreneurs operating these restaurants are alternative to conventional entrepreneurs, because they are engaged in a more sustainable food system. Therefore, the locations of restaurants serving mainly vegan, vegetarian, seasonal, local or organic food are used to determine spatial concentration of sustainable entrepreneurs in the restaurant sector.

3.2. Data collection

To research both personal values and spatial concentration, this research relies on two sources of data, a primary and a secondary source. Primary data consists of a survey of 300 entrepreneurs in the restaurant sector, 79% of whom serve sustainable food. The questions for this survey were determined based on the values that determine sustainable behaviour as discussed in section 2.1. Before distributing the survey, the questions were evaluated in an informal interview with a sustainable entrepreneur. Secondary data consists of the locations of all restaurants in the Netherlands, including sustainable restaurants. These locations were part of the LISA-dataset by the Dutch Chamber of Commerce, containing all businesses in the Netherlands in 2013.

Whether restaurants are sustainable is determined by their listings on websites for communities of consumers with sustainable diets. Restaurants serving at least 50% vegan, vegetarian and organic food were selected. Restaurants serving over 50% local and seasonal food were scarce, due to limited availability of local and seasonal products all year round. Therefore, there were no only local or only seasonal restaurants included in the sustainable restaurant selection. The final selection of sustainable restaurants consists of 591 locations. The control group consist of the 28165 locations of all restaurants in the Netherlands, including the sustainable restaurant selection.

3.3. Data Analysis

To determine the occurrence of spatial concentration in different spatial locations, a number of clustering estimates were executed on the LISA dataset, which contains all Dutch restaurants. Clustering analyses on the LISA data provided inputs for clustering analyses on the dataset of sustainable restaurants. Before the clustering analysis, however, a survey of 300 entrepreneurs was analysed to determine which values influence sustainable entrepreneurship.

3.3.1. Primary data analysis on entrepreneurship values

The data analysis of the primary data is used to test H1 that was presented in section 2.1. It consists of three steps, which can be found in table 1. The first step is a set of descriptive statistics and diagnostics, to determine possible issues with the data and to get a first impression on relations in the data. This set of descriptive statistics and diagnostics consists of a description of the variables in the dataset, percentiles and a collinearity test.

The second step of the primary data analysis consists of a factor analysis. The questionnaire resulted in seven variables, which represent egoistic, altruistic social and altruistic biospheric values as introduced by Steg & De Groot (2007). This was done to determine whether these three values correspond with the seven variables in the primary dataset. If there are factors in the dataset, the values representing these values need to be included as categorical variables in step three.

Step three is a binary logistic regression on the primary data, in which the sustainability of the restaurant is the dependent variable and the entrepreneurs' values are the independent variables. The variables that are part of a factor as tested in step two are included as categorical variables in

the regression. The binary logistic regression serves to determine which of the variables determine the sustainability of a restaurant.

Table 1. Steps for the primary data analysis on entrepreneurship values

	Data	*Methods*
Step 1: Descriptive statistics	Entrepreneur survey	Cumulative percentages, linearity and collinearity analysis
Step 2: Determining factors based on value literature	Entrepreneur survey	Factor analysis
Step 3: Determining which variables influence restaurant sustainability	Entrepreneur survey	Binary logistic regression

3.3.2 Secondary data analysis on the restaurant dataset

As can be seen in table 2, the data analysis for the secondary data consists of five steps. The first four steps are performed separately on the LISA and sustainable restaurant selection, except for step two which is performed only on the LISA data due to the small sample size of the sustainable restaurant selection. The fifth step is performed on an aggregate of the LISA and sustainable restaurants selection. All five steps of the analysis are required for H2, as some steps of the analysis are required as input for the next step. In the first step for the LISA data, an average nearest neighbour analysis was executed to determine whether the location of restaurants to their nearest neighbour was significantly shorter than expected, given the size of the database and the size of the Netherlands (Altman, 1992). For this analysis, the point data of the individual restaurants in the dataset were used. Second, a global Moran's I analysis was used to determine incremental spatial autocorrelation; the distance at which spatial concentration in the restaurant sector is most pronounced (Moran, 1950). The results from this estimate are used to determine the distance bands for the following analyses. For the third step, the point data was aggregated. The count of the number of points per neighbourhood was analysed, because polygon data is required for the spatial autocorrelation test. A Moran's I estimate of spatial autocorrelation was calculated in order to determine whether the spatial data was randomly or non-randomly distributed. A non-random distribution is an indication of dispersion, clustering or both. For the fourth step, the locations of clusters were determined using both an Anselin Local Moran's I analysis for clusters (Anselin, 1995) and outliers and a Getis-Ord Gi Hotspot analysis on the neighbourhood level (Ord & Getis, 1995). The fourth step is used as an input for the fifth step, which eventually aims to provide clarity on the second and third hypotheses. Before discussing the final and fifth step, the analyses on the sustainable restaurant dataset are described.

The analyses in step three and four were altered to be appropriate for the small sample of the LISA data. Ripley's K was used to determine spatial concentration instead of the Moran's I estimate on spatial autocorrelation that was used for the LISA dataset. The Ripley's K method computes distance bands around each restaurant (Getis, 1984). This distance band is based on the analysis in step two on the LISA dataset. For each distance band, the points within the band are counted and distributed randomly across the distance band. Then, the expected mean distance based on this random distribution is computed. After that, the observed mean distances are computed. Ripley's K does so for each point in the dataset, for multiple distance bands. The observed mean and expected mean distances are graphically displayed. A confidence envelope is then computed by randomly distributing the number of points in the dataset over the given space 99 times, after which the

Ripley's K analysis is repeated. This method was used because of the small sample of the sustainable restaurant selection. Aggregation on the polygon level, which is required for a Moran's I, was therefore inappropriate. The advantage of Ripley's K compared to the Moran's I is that it does not lose information to aggregation. The disadvantage, however, is that it cannot correct for population density when point data is used. Because the analysis on sustainable restaurants cannot be corrected for population, the LISA analysis is also not corrected for population.

Table 2. Step-wise analysis and mapping of spatial concentration

	Data	*Section*	*Method*
Step 1: Indicating spatial concentration	LISA	Data description	Average Nearest Neighbour
	Sustainable restaurants	Data description	Average Nearest Neighbour
Step 2: Determining distance increment of spatial concentration	LISA	Data description	Incremental Spatial Autocorrelation
Step 3: Cluster Analysis	LISA	Results	Moran's I
	Sustainable restaurants	Results	Ripley's K
Step 4: Mapping spatial concentration	LISA	Results	Hot Spot Analysis
	Sustainable restaurants	Results	Hot Spot Analysis
Step 5: determining difference between sustainable and general spatial concentration	Aggregate data of LISA and sustainable restaurants	Results	McNemar's test, chi-square test and logistic regression

For step four of the analysis, an optimized hot spot analysis that automatically aggregates the data on the optimal level was used. A fishnet polygon was calculated and covered the dataset. Based on the counts per cell, the analysis was performed in the same way as the analysis on the LISA dataset. Because the hotspot analysis requires polygon data, the fishnet polygon was used instead of formal geographical regions.

Finally, in order to determine whether the results from the cluster analyses for the sustainable and LISA restaurants were significantly different from each other, a binary nonparametric analysis was performed on an aggregate of the LISA and sustainable restaurants cluster analyses. For all restaurants in the dataset it was determined whether they were located inside a sustainable cluster, a general restaurant cluster, both clusters or none. Based on this binary dataset derived from the cluster locations, a McNemar's test was executed (McNemar, 1947). This test, when significant, indicates whether there is a significant difference between the groups of restaurants, based on their prevalence in a sustainable or general cluster, which gives an indication of the extent to which the clusters are in the same location. If many restaurants are in the sustainable and general cluster, this indicates similarity in location. If many restaurants are to be found in one cluster only, it indicates dissimilarity in location.

The same binary data was used to determine whether the presence of a general restaurant cluster influences the prevalence of a sustainable cluster. This influence could occur when localization

economies are prevalent, as follows from McCann (1995) and Bosma et al. (2008). This was tested with a chi-square statistic and a binary logistic regression for the direction of the effect.

3.4. Data description

3.4.1. An indication of factors in entrepreneurship values

The independent variables described in table 3 were originally sampled as ordinal variables, but were recoded into binary values to reduce the number of variables and to provide a stronger model. The original variable was indicated on a 1-5 likert scale from "not motivated at all" to "highly motivated." The number of cases included in the analysis is 205 instead of the 300 described earlier, because of a large number of missing cases for some of the independent variables. Sustainable entrepreneurs are motivated more than conventional entrepreneurs by each of the variables, except for *MotiBusi*. This could indicate a negative effect of this variable on sustainable entrepreneurship as compared to conventional entrepreneurship. This would be in line with Steg & De Groot (2007) that egoistic values negatively influence sustainable entrepreneurship and with Cato et al., (2008) that making money is a secondary goal. Furthermore, the differences between sustainable and non-sustainable entrepreneurs are especially large for the *MotiSociety*, *MotiEnv* and *MotiEatDiff* variables, indicating a positive relationship between these independent variables and the dependent.

Table 3. Description of the variables for the binary regression on entrepreneurship values

Variable	*Description*	*% yes*	*% sust**	*% non-sust*
Dependent				
SustYesNo	The restaurant serves sustainable food. 1 = yes	77.7%		
Independent				
MotiWork	Motivated by enjoyment of working in a restaurant. 1 = yes	82.2%	83.0%	79.5%
MotiManage	Motivated by enjoyment of managing a restaurant. 1 = yes	80.4%	81.5%	76.7%
MotiBusi	Motivated by business opportunity. 1 = yes	70.4%	68.4%	77.3%
MotiEatDiff	Motivated by the desire to motivate other people to eat differently. 1 = yes	48.7%	53.6%	31.8%
MotiEnv	Motivated to achieve environmental goals. 1 = yes	32.0%	38.6%	9.1%
MotiSociety	Motivated to achieve societal goals. 1 = yes	48.2%	54.2%	27.3%
MotiPeople	Motivated by social goals. 1 = yes	69.2%	69.9%	66.7%

* Sust is short for sustainable

3.4.2. An indication of spatial concentration and distance increment

The LISA data is highly concentrated, when not corrected for the population in a region. The nearest neighbour analysis (see table 4) indicates spatial concentration, $p < .001$. This is also indicated by the observed mean distance, which is much smaller than the expected mean distance. Also, the nearest neighbour ratio is smaller than one, which indicates a pattern of spatial concentration. The sustainable restaurant data shows a pattern of concentration as well, with a nearest neighbour ratio of below one and a low observed mean distance compared to the expected mean distance, $p < .001$ (see table 4). Based on the nearest neighbour analysis, patterns of spatial concentration can be

expected for the entire restaurant sector and the subset of sustainable restaurants, as hypothesized in section 2.2.

Table 4. Average nearest neighbour analysis for entire restaurant sector and sustainable restaurant selection

All restaurants		*Only sustainable restaurants*	
Expected mean distance (m)	917.440612	Expected mean distance (m)	4859.3682
Observed mean distance (m)	173.794240	Observed mean distance (m)	1769.9514
Nearest neighbour ratio	0.189434	Nearest neighbour ratio	0.364235
z-score	-305.493797	z-score	-29.567957
p-value	0.000000	p-value	0.000000

After establishing spatial concentration with the nearest neighbour analysis, the incremental spatial autocorrelation analysis in step two of the secondary data analysis indicates at which distance spatial concentration or dispersion is most or least dense. The analysis is highly significant with a peak at five kilometres $p < .001$ (see figure 1). There is a trend break again at 15 kilometres, from which the decline of spatial autocorrelation is less steep. This could indicate the difference between walking or cycling distance and driving distance. In the Netherlands, it is common to walk or cycle distances up to five kilometres. The car is a more likely mode of transportation after fifteen kilometres. When travelling by car, an extra kilometre is less of a hurdle than when travelling by bike or foot. The lowest dip in the spatial autocorrelation is at a distance of 50 kilometres.

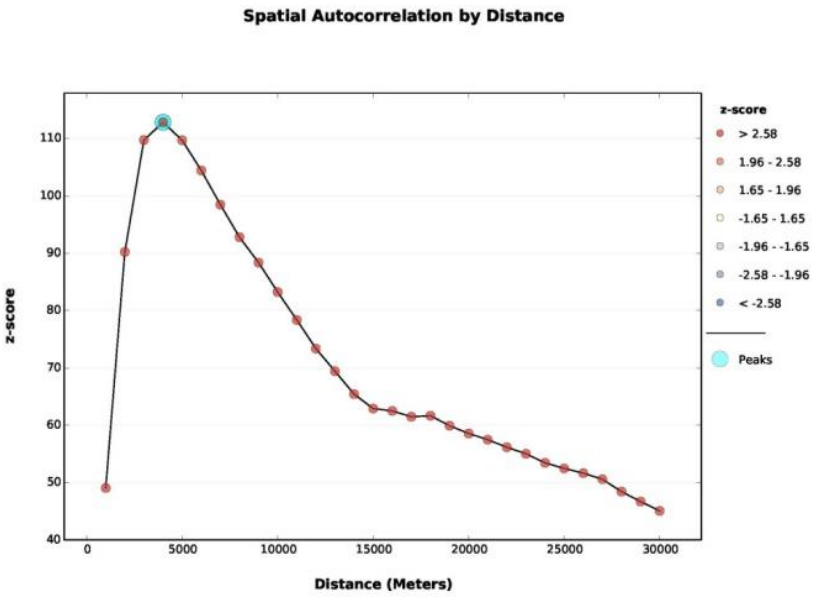

Figure 1. LISA dataset incremental spatial autocorrelation.

4. Results & discussion

The following paragraphs discuss the results. First, step two and three of the primary data analysis on entrepreneurship values are discussed, after which step three, four and five of the secondary data analysis are discussed.

4.1.1. Sustainable entrepreneurship value groups

For the second step of the primary data analysis, a factor analysis was performed of which the results can be found in table 5. The entrepreneurship survey contains a number of questions on the motivations of entrepreneurs to start a business, of which some questions referred to the same value; that was egoistic, altruistic biospheric or altruistic social. A factor analysis was performed in order to determine whether some questions referred to the same values. From the seven questions on values in the survey, the factor analysis extracted two factors. *MotiPeople*, *MotiEnv, MotiSociety* and *MotiPeople* are all part of one factor, which was named the altruistic factor. *Motiwork* and *Motimanage* were indicative of a second factor, which was called the egoistic value. Because they related to the passion of the entrepreneur for the sector, they were considered to be part of a passionate egoistic value. Kirkwood & Walton (2010) indicate that passion was important in determining ecopreneurship, so it could also be a determinant of sustainable entrepreneurship. The *MotiBusi* was most related to the egoistic group, but not enough to be included in the factor group. This indicates that this question captures a different motivation than the egoistic passionate motivation indicated by the *MotiWork* and *MotiManage* value. This is not in line with Steg & De Groot (2007) that there is only one egoistic value influencing environmental behaviour. Furthermore, a difference as indicated by Steg., et al. (2014) between altruistic biospheric and altruistic social values was not found. Cronbach's alpha is over .7, which indicates that the factor analysis is reliable. Furthermore, the cumulative explained variance of the two factors is good with 40% There were no issues with the reproduced residuals for this analysis and the KMO-measure of sampling adequacy was 0.62. This is a moderate score, but not below the minimum acceptability of 0.5 and most likely due to the small number of cases.

Table 5. Rotated factor loadings for the factor analysis on entrepreneurship values

	Rotated Factor Loadings	
Item	Altruistic: adding value	Egoistic: Passion for restaurant business
MotiWork	.01	**.77**
MotiManage	.06	**.70**
MotiBusi	*-.03*	*.29*
MotiEatDiff	**.49**	-.06
MotiEnv	**.74**	-.05
MotiSociety	**.76**	.03
MotiPeople	**.50**	.06
Eigenvalues	2.23	1.62
% of variance	24.07%	15.73%
α	.71	.70

*N=205. Factor loadings over .40 appear in bold

4.1.2. The influence of entrepreneurship values on sustainable entrepreneurship

As indicated by the factor analysis in the previous section, there were two factors in the model. The variables that were part of a factor were therefore included as categorical variables in step three of the primary data analysis. The VIF and tolerance multicollinearity tests indicated no problematic multicollinearity for any of the variables. Furthermore, there were no problems with the linearity of the model, because only binary variables are used. The models in table 6 were estimated with backward modelling. Although model 2 represents the ultimate model, it did not significantly

increase the R^2 but rather decreased it in relation to model 1. Therefore, model 1 is adopted. However, model 2 is shown because it highlights the effect of the variable MotiEnv on the dependent. It indicates that a large part of the explanatory power in the model originates in the motivation to do something for the environment. Although model 1 shows that the altruistic factor is the differentiating factor between conventional and sustainable entrepreneurship, the environmental value is the most important variable of this factor, as indicated by Steg et al. (2014).

In model 1, only *MotiEnv* and *MotiSociety* are significant with a positive effect on sustainable entrepreneurship. When considering the non-significant effects, only *MotiBusi* has a negative effect on sustainable entrepreneurship. This could be due to a lower interest in non-pecuniary benefits as indicated by Cato et al. (2008), since sustainable entrepreneurs could view the environmental and social goals they reach as alternative benefits of sustainable entrepreneurship. It is also in line with the research by De Groot & Steg (2008) that egoistic values are negatively related to environmental behaviour. Because both altruistic social and altruistic biospheric values have a significant effect on sustainable entrepreneurship, H1 is not rejected: Altruistic values differentiate sustainable entrepreneurship from conventional entrepreneurship.

Table 6. Coefficients of the binary logistic regression predicting entrepreneurship values.

	B	S.E.	*95% Confidence Interval*			Significance
			Lower	*Odds*	*Upper*	
Model 1						
Constant	.63	.63		1.87		.322
MotiWork	.25	.59	.40	1.29	4.11	.671
MotiManage	.62	.56	.62	1.84	5.50	.269
MotiBusi	-.56	.46	.23	.57	1.41	.225
MotiEatDiff	.32	.43	.60	1.37	3.16	.458
MotiEnv	.78	1.07	.97	16.14	132.07	.010*
MotiSociety	.98	.48	.04	2.67	6.90	.042*
MotiPeople	.73	.43	.21	.48	1.12	.088
Log likelihood	163.371					
Chi²	35.294					
Model significance	.000					
Nagelkerke R²	.261					
Cox & Snell R²	.169					
N	205					
Model 2						
Constant	.85	.19		2.35		.001**
MotiEnv	3.23	.55	.14	6.28	18.45	.002**
Log likelihood	172.078					
Chi²	26.587					
Model significance	.000					
Nagelkerke R²	.201					
Cox & Snell R²	.130					
N	205					

**P < 0.05 **P < 0.01*

4.2.1. Spatial concentration

The distance bands for the spatial concentration analysis were determined by the results from the incremental spatial autocorrelation analysis performed earlier (see figure 1). As the peak distance for spatial concentration in the LISA dataset was 5 kilometres, this was determined as the distance increment. Because the incremental spatial autocorrelation analysis was found to decrease until its low at 50 kilometres, 50 kilometres was determined to be the last distance band.

Table 7. Moran's I for the LISA dataset

	Moran's I LISA
Moran's Index	0.151263
Expected Index	-0.000085
Variance	0.000006
Z-score	60.163197
P-value	0.000000

The Moran's I indicates spatial concentration for the uncorrected LISA dataset, $I = .15$ $p < .001$, (see table 7) while Ripley's K also indicates spatial concentration for the sustainable restaurant sector, as can be seen in figure 2, $p < .001$. The observed K statistic is far outside the 99% confidence envelope indicated by the dotted line. Spatial concentration in the sustainable restaurant sector reaches its peak at five kilometres, which indicates that spatial concentration in the sustainable restaurant sector occurs at the same level as conventional restaurants. Ripley's k still indicates spatial concentration at 50 kilometres, although this decreases from its peak at five kilometres. That the peak is at five kilometres could be because restaurants co-locate to attract a larger market, as indicated by McCann (1995), because the browsing consumer would probably not travel far to view all the dining opportunities. Spatial concentration was already indicated by the nearest neighbour analysis in the data description and is confirmed by the Ripley's K statistic. This result is an indication that H2 tends to be accepted. Although this analysis proves spatial concentration of sustainable restaurants, it does not prove that the spatial concentration for sustainable restaurant is different from the spatial concentration of all restaurants. Therefore, based on the analysis in step four, the McNemar's test in step five provides the final test of H2: Due to the physical proximity of actors in social networks, sustainable entrepreneurship tends to concentrate.

4.2.2. Locations of spatial concentrations

When the spatial concentration for the LISA dataset is mapped, a pattern of spatial concentration in the larger urban areas of the Netherlands is found (see figure 3). Also, some concentrations are found in areas which attract an above average number of tourists. In the Dutch sustainable restaurant sector, there is only one large concentration for the entire country, spanning the area of the 4 largest cities in the Netherlands: Amsterdam, Rotterdam, the Hague and Utrecht (see figure 3). This could be due to agglomeration economies as proposed by Brülhart & Mathys (2008). However, this is also the most densely populated part of the Netherlands, and both analyses are not corrected for population. On the other hand, other agglomerations do not have a spatial concentration of sustainable restaurants, although there are two more general restaurant clusters in the south of the country (see figure 3).

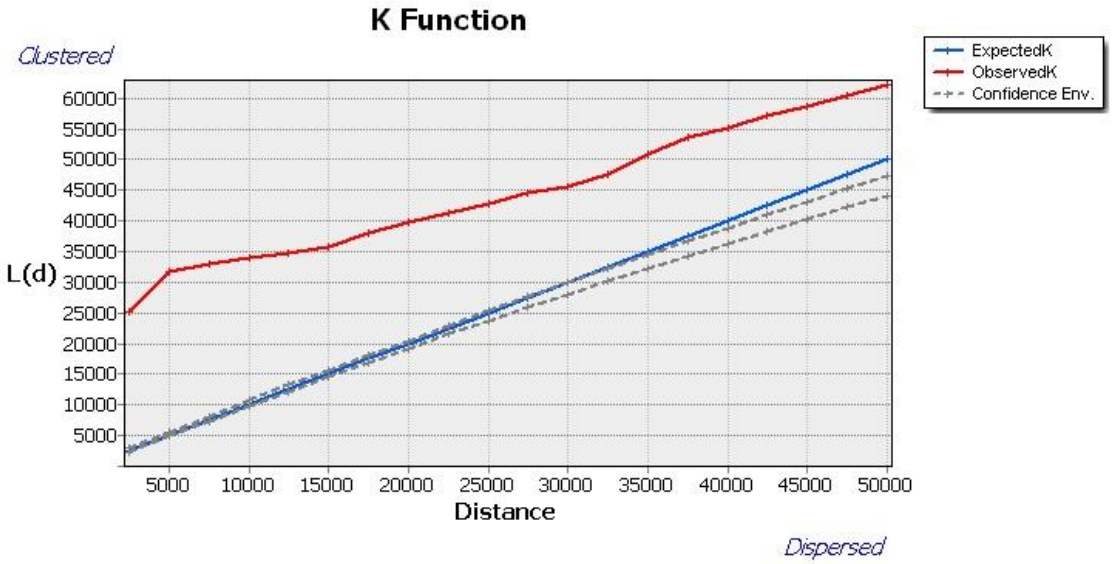

Figure 2. Ripley's K for sustainable restaurants at the 99% confidence level

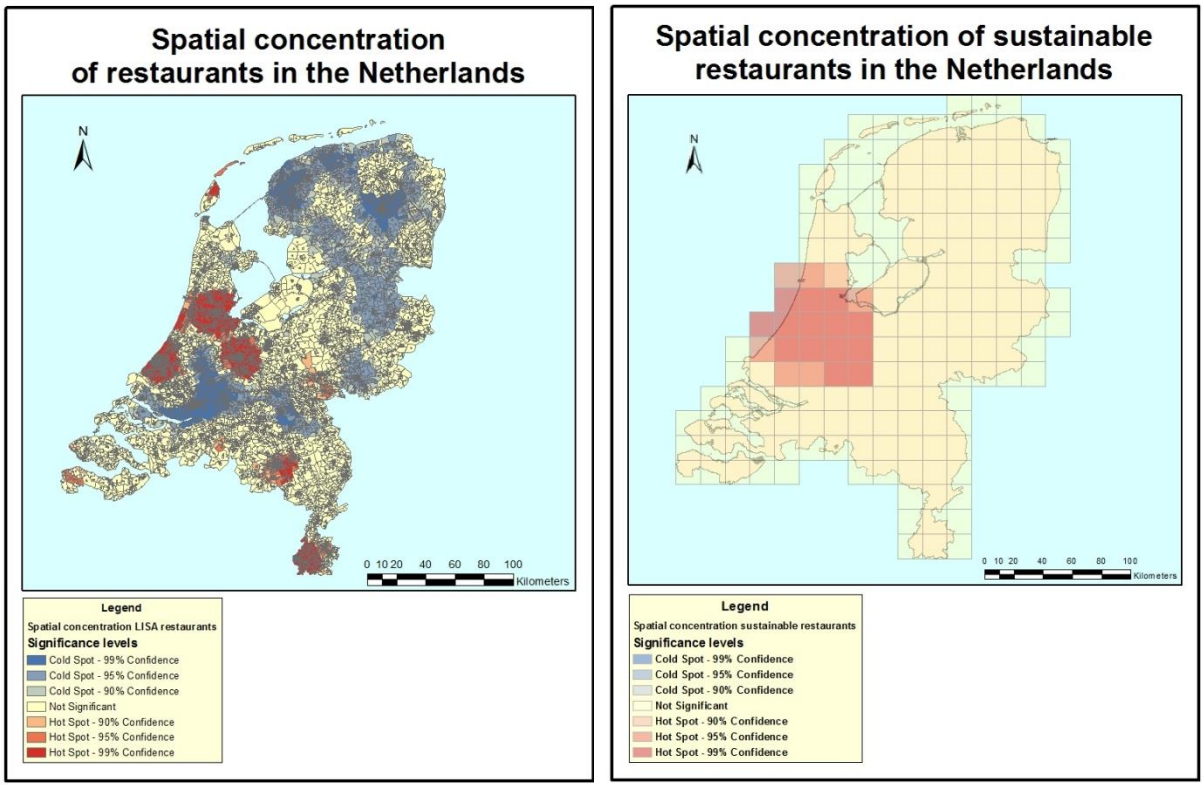

Figure 3. Spatial concentrations of restaurants in the Netherlands.

4.2.3. The difference between sustainable and general clusters

The percentages of sustainable restaurants in table 8 are based on the maps in the previous section. They show that sustainable restaurants occur more often in both sustainable and general clusters. This indicates that sustainable restaurants have a higher propensity to cluster and that spatial concentration of sustainable restaurants is positively influenced by spatial concentration of all restaurants, as in the literature on localization economies (McCann, 1995; Bosma et al., 2008). The chi-square test and binary logistic regression in the results section continue on this relation between sustainable and general clusters.

Table 8. Description of variables used in the chi-square test for the secondary data

Variable	*Description*	*% yes*	*% green*	*% general*
SustYesNo	The restaurant serves sustainable food	0.02		
ClusterGreen	The restaurant is located in a sustainable cluster	38.1%	62.0%	37.6%
ClusterGrey	The restaurant is located in a general cluster	35.0%	53.7%	34.6%

The last step of the secondary data analysis consists of a McNemar's test to determine whether the sustainable cluster and general cluster contain the same restaurants. From table 9 it can be seen that most restaurants are either not in a cluster at all, or in both clusters at the same time. However, 19,3% of the restaurants is either only in a sustainable or only in a general cluster. This indicates a difference in location for the green and grey cluster.

Table 9. Description of variables used in the McNemar's test

		ClusterGrey		
		0 (No)	1 (Yes)	Total
ClusterGreen	0 (No)	53.7%	8.1%	61.8%
	1 (Yes)	11.2%	26.9%	38.2%
	Total	65.0%	35.0%	100%

After the data description, the McNemar's test was used to determine whether the sustainable cluster and general clusters were part of the same population. The test results indicate that the locations of the restaurants in the sustainable cluster and the locations of the restaurants in the general cluster are different from each other, $\chi^2\,(1) = 141.6$ $p < .001$. Because the locations of restaurants in the sustainable and general cluster are essentially different, H2 is not rejected: Due to the physical proximity of actors in social networks, sustainable entrepreneurship tends to concentrate. A separate chi square statistic was performed to determine whether the presence of a general cluster influences the likelihood of a sustainable cluster. The chi-square statistic indicates that the locations of the sustainable and general cluster are not independent. There was a significant association between the clusters, $\chi^2\,(1) = 9843.7$ $p < .001$. A binary logistic regression indicated that the effect of the general restaurant cluster on the sustainable restaurant cluster was positive, $b =$ 2.746 Nagelkerke $R^2 = .403$ $p < .001$. Because the general cluster has a significant effect on the sustainable cluster, H3 is not rejected: The spatial concentration of sustainable SMEs occurs in areas with a large share of similar businesses.

6. Conclusion

This article has considered sustainable entrepreneurship as a way to achieve sustainable development; sustainable entrepreneurship adds value for society, prevents environmental degradation and provides profit for the entrepreneur. Sustainable entrepreneurship is unique because it requires the three values that have been found to be related to environmental behaviour; egoistic values are negatively correlated with environmental behaviour and altruistic social and biospheric values are positively correlated with environmental behaviour (Steg & De Groot, 2007).

This article hypothesized that the difference in conventional and sustainable entrepreneurship is the dominance of the altruistic value. In this research, especially biospheric altruism gives an incentive for sustainable behaviour, more so than social altruism. This corresponds with the findings of Steg (2014), who found that altruistic social and biosperic values are both positively related with environmental behaviour, but that biospheric values are a more important predictor than social values. Although earlier research shows that egoistic values have a negative effect on environmental behaviour (Steg & De Groot, 2007; De Groot & Steg, 2008), no significant negative effect was found in this research. It was found, however, that a distinction can be made between egoistic 'passionate' values and egoistic 'monetary' values. These values appear to have different effects on sustainable entrepreneurship. Although they were not significant predictors of sustainable entrepreneurship, the 'monetary' value had a small negative effect, while the 'passionate' values had a small positive effect. In earlier research, passion was found to be an important value in ecopreneurship, more so than financial considerations were (Kirkwood & Walton, 2010).

The values in this research are personally tested, but are also socially determined. Strong social networks are characterised by reciprocal trust and similar values and norms (Huber, 2009). When trust is high, convergence of values, norms and behaviour occurs (Durlauf & Fafchamps, 2004). Because of different social values and social norms across different networks, some social networks have a higher likelihood of producing sustainable entrepreneurship than others. Social interaction has lower costs for the actors when actors are near each other physically (Glaeser, et al., 2000), so they can meet face to face more often. Because the actors in a social network are often geographically proximate, spatial concentration of similar activity can occur, based on personal and social values.

It was indicated by a nearest neighbour analysis, Moran's I analysis and Ripley's K analysis that spatial concentration of entrepreneurship occurs in both the general and sustainable restaurant sector. An incremental spatial autocorrelation analysis showed that the largest effect occurs within a distance of five kilometres, which is walking or cycling distance in the Netherlands. The restaurants in the sustainable restaurant cluster and the restaurants in the all restaurants cluster do not belong to the same population of restaurants. Thus, the locations of the clusters are not the same, geographically. They do, however, have an influence on each other. A binary logistic regression showed that spatial concentration of all restaurants has an effect on the spatial concentration of green restaurants, due to the more recent interest in sustainable development. This could imply that localization effects are in place, as was expected based on the literature. It can be concluded that, based on the social and personal values of entrepreneurs, sustainable SMEs in the restaurant sector tend to concentrate spatially.

Although the analysis was limited due to the small sample size of the sustainable restaurant selection, it could be the best sector for an analysis on sustainable entrepreneurship. Larger sample sizes of sustainable entrepreneurs might not occur in other sectors. However, it could be interesting to repeat this analysis on a sample of sustainable entrepreneurs in a high-tech sector. The findings from this research could be transferable to low-tech industries, especially in the service sector, but in high-tech industries, the spill over of knowledge gives rise to technological innovation (Huggins & Thompson, 2015). The effect of personal and social values could be different than in a low tech industry, because this technological knowledge is the product of social capital and therefore of social networks.

6.1. Recommendations for future research

The findings of this research could be differently transferable to the high-tech sector in which knowledge spill overs give rise to technological innovation. The interaction between value convergence and information sharing could possibly give rise to sustainable innovation. Therefore, it would be interesting to research how the value mechanism of this research interacts with knowledge spill over for technological innovation.

Furthermore, as indicated by the factor analysis, a difference was found between the effect of 'passionate' and 'monetary' egoistic values. Although monetary values are known to have an effect on environmental behaviour, environmental psychological literature does not seem clear about 'passion' for a certain business or activity. The variables that indicated passion for managing or working in a restaurant had a slight positive, although not significant effect. Perhaps passion could be described as part of a hedonic value set. It would be interesting to further research the role of passion for a certain activity. An interesting question could be, for instance: Are sustainable entrepreneurs who aim to make the restaurant sector more sustainable only more passionate about sustainability issues than conventional entrepreneurs, or are they also more passionate about working in the restaurant sector?

Furthermore, the distance at which spatial concentration occurs most prominently in the Netherlands in the restaurant sector was found to be five kilometres. This could be because cycling and walking are popular modes of transportation in the Netherlands. Therefore, it would be interesting to repeat this analysis for countries where different modes of transportation are preferred.

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