

LYCar Company Project Report

“What factors can influence the acceptance of vertical farming by ecotourists?”

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Executive summary

The subject of this study is the expansion of ecotourism through the concept of vertical farming. The researcher fostered an interest in vertical farming in 2020 and wished to illustrate his accumulated knowledge in tourism and sustainable practice to cover the topic in an area that has yet to be investigated.

In the problem definition, the researcher introduces the topic of ecotourism which is a sub-category of sustainable tourism and tourism. The ecotourism industry, which has had a steady growth of 5% since 2018 can be defined as a practice of tourism that focuses on the ecological and social bottom lines to meet the challenges of the 21st century. Ecotourism is based on six pillars: nature-based, preservation, education, sustainability, equal benefits, and ethical responsibility. In the problem definition, the researcher also explained that ecotourism, an industry that is always required to innovate, has expanded through the concept of vertical farming. Vertical farming, which is an urban, indoor, and high-tech agricultural practice, complies theoretically and practically with the pillars of ecotourism, making it a relevant aspect to explore for the expansion of ecotourism.

However, the expansion of vertical farming in ecotourism is hindered by the low acceptance of this new agricultural practice. Common factors include the low knowledge of the system, an issue of unromanticized image, and a scepticism towards its financial feasibility. A situational scan led to the realisation that external parties play a great role in decreasing the scepticism of the public towards a specific new technology. Moreover, Urban farming, the cousin of vertical farming, gathers high-acceptance results amongst the public due to its big similarities with the traditional farming model. Finally, the researcher understood, that the ecotourist market is a resilient market that usually raises its acceptance once personal benefits are illustrated to them. The problem definition led the researcher to design the main research question of this study: **“What factors can influence the acceptance of vertical farming by ecotourists?”**.

A literature review was undertaken to discover what were the factors of low acceptance that were directly linked to vertical farming within ecotourism. The unified theory of acceptance and use of technology was used to guide this literature review. Therefore, the factors were investigated and categorised in the groups “performance expectance”, “effort expectance” and “social influence”, which are the three variables affecting the overall acceptance of a system. In performance expectance, the researcher understood that people usually doubt the ecological added value of vertical farming. Another factor discovered was the fact that vertical farming, through its high-tech methods does not perfectly represent nature. In effort expectance, the factor of technophobia was brought to light: technophobia causes discomfort or physical anxiety to the ecotourists when consuming technology-produced goods. Finally, in social influence, the researcher understood that vertical farming, through its elitist image could reinforce the already existing elitist image associated with ecotourism. Secondly, vertical farming is a threat to employment by replacing the jobs of traditional farmers with robotised systems.

Once all these factors were discovered, the researcher created a research design to understand which of these factors are the most important to ecotourists. Primary data was collected by means of a survey, distributed to the ecotourist population. The outcomes of the statistical tests showcased that the most contributing factors to the scepticism of ecotourists towards VF were the sustainable views, the employment practices, and the image of elitism. The factor of technophobia was discredited, and the factor of the natural views was neither confirmed or discredited. From the statistical test emerged another factor which was the misbelief in the cost-benefit ratio of vertical farming. At this point, the researcher also realised that there was a gap between the perception of people regarding vertical farming and the reality of the concept, which points towards the miseducation of people on the concept, which is the root cause of all future resistance.

In the next step, the researcher designed a solution to deconstruct the unfounded perceptions of ecotourists regarding the image of elitism, sustainable views, and employment practices. A focus



group was held with Marjan de Jong, Gemma Gisy, and Francesco Filipetti to co-create an optimal solution. The researcher ultimately combined the focus group outcomes, scientific evidence, and his own understanding to develop the vertical farming learning module. This educative tool, to be pilot tested at Hotelschool The Hague, in the Future of Food Minor, consists of three phases. The main activities included in this module are a visit to a vertical farm in Wageningen University, preparation of jigsaw presentations on different topics linked to vertical farming and a reflection around the concept of vertical farming, to understand how the opinion of the participants has evolved thanks to proper education on the topic. The learning module was made bearing in mind the Taxonomy of Significant Learning Model by Dee Flink, ensuring its quality as an educative tool to be implemented in a University. Financially wise, low costs also guarantee its feasibility.

The evaluation plan has been set to understand the extent to which the learning module will impact the opinion of the students and the wider ecotourist population when it comes to vertical farming. The main tools will be displayed at the end of the learning module: for example, the jigsaw presentation and their quality will give an overall idea of the knowledge gained. Moreover, the time capsule concept will be applied to capture before and after the module the opinion of the targeted students and see how opinions have changed on an individual level. On the larger scale, the researcher hopes to influence the vertical farming industry, hospitality businesses, and ecotourist population on the long term, however, as the solution is a pilot test, effects on the wider scale will only be noticeable in the long term. Key performance indicators track in that regard are the increase in hospitality/vertical farming projects or the overall acceptance evolution of vertical farming that can be assessed by reutilising the survey from the analysis part.

In the dissemination chapter, the researcher defined the audience of this report as the ecotourists, academicians, educative bodies, vertical farming employees, and hospitality employees. Dissemination of the research results on ResearchGate enabled the researcher to target the Academicians. On the social media platforms, an infographic targeted hospitality businesses and ecotourists. An email summarizing the thesis outcomes and the full research report was sent to 15 vertical farm enterprises to target the vertical farm employees. Finally, the researcher aims at further disseminating to educative bodies and ecotourists by means of the LYCar event and a planned urban farming event in January. Overall, the researcher is confident that the results were widely spread, as shown by more than 100 views on ResearchGate. However, very limited feedback was provided on the dissemination channels. The researcher trusts that the direct communication with the targeted audience, during the planned events of January 2022, will yield direct feedback.

In the final chapter, the researcher reflected on the project paradigms. The lack of existing research on the topic of ecotourism and vertical farming limited the search of patterns and paradigms in the literature review. However, the research project, through its methodological design has a real added value for the Academician population, because it contributed to increasing the knowledge on the topic, which can be further used as a steppingstone for ecotourism or vertical farming research papers. The survey method, although limiting the apparition of new paradigms, was a useful tool to gather many data and draw conclusions. For the future, the researcher recognises that there would be added value in analysing the acceptance of vertical farming while considering other variables (such as age, income level, or psychographic and behavioural attributes). Relevant research to conduct, linked to this paper, would be to gain a clear understanding of the ecological added value of vertical farming, find ways to integrate vertical farming best practices within our traditional agricultural models, and further the knowledge on the profile of ecotourists.



Preface and acknowledgments

Dear reader,

To validate the obtention of a bachelor's degree in Hospitality management at Hotelschool The Hague, the researcher completed a research project on the subject of ecotourism and vertical farming. The research project is based on the Data-Base Research cycle, this is a 5-step process that covers the definition of a problem to its analysis and then on to the design, implementation and evaluation of a solution that tackles the problem.

For this project, the researcher investigates the problem of the low acceptance of vertical farming amongst the ecotourist market. The researcher completed the first two steps of the Data-Base Research cycle by handing in and validating a proposal of research (App.1). This new report depicts the full cycle, including the validated and reworked proposal.

The researcher, in his project was able to benefit from the advice and the help of a circle of dedicated and knowledgeable colleagues.

Special thanks go to Katina Gikas, who coached the researcher by providing insightful tips on improve the quality of the report in its shape and in its content.

The researcher thanks Marjan de Jong who commissioned the topic and enabled the researcher to develop his ideas and interest in the research topic.

The researcher also wants to share his gratefulness to his course group composed of Francesco Filipetti and Daan van Houten, for their advice; to the lecturers who shared their knowledge and contributed to the overall quality of the report, this includes amongst other Ms Schepel, Mr Chia and Mr van Rheede; the participants of the focus group: Gemma Gisy, Francesco Filipetti and Marjan de Jong.

Finally, the researcher acknowledges and thank the SDG/CE community of Hotelschool The Hague, all those who participated in the research survey for their support and help.

Yours Sincerely,

The researcher, Tanguy Pechoultre de Lamartinie



Precondition checklist

Precondition	Status
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List of abbreviations

Abbreviation	Meaning
AAR	After-Action Review
F&B	Food and Beverage
FoF	Future of Food
HTH	Hotelschool The Hague
LYCar	Launching Your Career
PDM	Project Dissemination Model
MRQ	Main Research Question
PLO	Professional Learning Outcomes
RQ	Research Question
SDG	Sustainable Development Goals
TSL	Taxonomy of Significant Learning
UTAUT	Unified Theory of Acceptance and Use of Technology
VF	Vertical farming



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1. Problem definition

1.1. Introduction

1.1.1. Scopes of tourism

This study investigates ecotourism, which belongs to the broader scopes of tourism and sustainable tourism.

Tourism was defined as the movement and the activities of individuals to new destinations (Mathieson and Wall, 1982). Tourism rapidly expanded globally. By offering transport, accommodation, entertainment and food and beverage (F&B) (Lafferty and Fossen, 2001), it reached trillion USD ranging revenues in 2015 (Petliovana, 2016).

The branch of sustainable tourism emerged as a realisation that tourism could be used to improve the societal, economic, and ecological bottom-lines, like the high employment value of the industry (Swarbrooke, 1999). It reflects the need for sustainable changes, advocated by the *United Nations* in 1987 in “*Our Common Future*” (D’Arco et al., 2021).

Ecotourism is a sub-category of sustainable tourism that focuses on the ecological and social bottom-lines (Hasan, 2014). Although the definition is unclear (Donohoe and Needham, 2006), this study will consider the six agreed-upon components pillars of ecotourism: nature-based, preservation, education, sustainability, equal benefits, and ethical responsibility (ibid; TIES, 2021). An example of ecotourism is *Agriturismo* that provides 90%+ locally supplied F&B services, accommodation, and activities (Bakerjian, 2019).

In 2018 (vs. 2017), tourism grew by 7%, sustainable tourism by 6%, and ecotourism by 5% (O’Connor, 2018; CREST, 2018). The growth of 5% is impressive when considering that ecotourism is a niche market and justifies the relevance to studying it.

1.1.2. Expanding ecotourism

Because trends change rapidly, ecotourism must constantly innovate (Gurung and Scholz, 2008). Ecotourism has a high-potential innovative pattern: it focuses on adapting natural resource-utilization activities into recreational activities (Asadi and Kohan, 2011). For *Agriturismo*, the production of farming products is turned into F&B experience, farming workshops, and lodging.

This innovative pattern inspired the American brand *Tower Farms* to exploit the concept of vertical farming (VF) (Tower Farms, 2021). VF is an indoor and environment-controlled agricultural consisting of growing crops on stacked shelves (Despommier, 2013). *Tower Farms* partners with third parties to develop VF projects in customer-orientated firms (ibid).

Tower Farms showcases that VF can be integrated into ecotourism to add sustainable and profit-orientated value. Moreover, VF theoretically matches the pillars of ecotourism (Table.1), making it a relevant concept to study.

Table.1: Ecotourism and VF

Pillar	Explanation
Nature-based	VF aims at producing fresh produce (Despommier, 2011).
Preservation	VF reduces required arable land and preserves ecosystems by being an urban practice (Despommier, 2013).
Education	VF is used in schools to educate on future food production methods (Hopewell Elementary School, 2018; Pascual et al., 2018).
Sustainability	Socially, VF has high employment needs (Benke and Tomkins, 2017). Ecologically, VF reduces the needs for fresh water, arable land and fuel (ibid; Saxena, 2021; Jasonos and McCormick, 2017; Lyra et al., 2021).
Equal benefits	VF offers agricultural opportunities in all parts of the World (Despommier, 2013).
Ethical responsibility	See equal benefits, sustainability, and preservation.

1.2. Problem definition

The researcher defined ecotourism and VF and showed that VF brings additional value when integrated into ecotourism. **However, there is a problem that hinders the expansion of VF within ecotourism: the low public acceptance associated with VF.** For example, the recreational and production unit *Uit je Eigen Stad* listed non-acceptance of aquaponic vertical systems in their bankruptcy report (de Graaf, 2016; Kartika, 2017).

The low knowledge of VF raises scepticism and misconceptions (Jürkenbeck et al., 2019; Tablada et al., 2020). Moreover, the high-tech technology practice of VF conflicts with the romanticized image of agriculture (Jürkenbeck et al., 2019; Specht et al., 2019). Finally, there is economic scepticism towards VF (Specht et al., 2016).

The low acceptance of VF is one of the main obstacles to the materialisation of ecotourism-based VF prototypes (such as *Vertigrow* in Sydney or the award-winning prototype of the *Aquaponic Experience hotel* (Fig.1) (Cloherty, 2018; McKnight, 2017; Shah, 2018)).

Fig.1: Aquaponic Experience hotel





1.3. Situational scan

1.3.1. External parties and public acceptance

A study on public acceptance of new technologies shows that most new projects fail because they are not well introduced to the public (Rogers et al., 2008). Third parties can be used to reduce this.

Through their high visibility, governments can advertise ecotourist concepts (Bhuiyan et al., 2011). For example, the *Edible Garden City* in Singapore owes its success to the local authorities that provided building space and an accepting legal framework (Low, 2019). This example of an urban farm differs from VF, which has low governmental support (Allegaert, 2019). The researcher, therefore, advises to focus on public third parties.

Private firms also increase public acceptance. For example, the *Netflix effect* shows how companies can popularize concepts: in 2020, there was an increase of 125% of sales of chess boards, which coincided with the release date of the chess-based mini-series *The Queen's Gambit* (Crosby, 2021). Regarding VF, the case of *Tower Farms* is similar: by partnering with *Google* and *Nasa*, the 11-employee company build strong credibility and reached 107 farms in total (Tower Farms, 2021).

1.3.2. Acceptance of urban farming

Urban farming is the broader scope including VF (Dane, 2020). VF differs from all other urban farming methods because only VF and greenhouses are indoor practices (ibid), and VF utilises the most high-tech practices (ibid).

VF is the least accepted urban farming method (Kartika, 2017), and there is a preference for green spaces methods (Jürkenbeck et al., 2019). Participants think that the most attractive factors of urban farming are “fresh”, “local” and “green” (Grebitus et al., 2020). For example, the *Edible Garden City* is successful because it manages to preserve the romanticized image of a traditional vegetable garden (Low, 2019).

1.3.3. Ecotourists and technology acceptance

Tourism has undergone massive technological changes recently, such as online bookings, e-commerce, social media marketing, or mobile applications (Ukpabi and Karjaluoto, 2017). The touristic market is known for being very resilient, and consequently, the use of technology has been normalised (ibid). The e-booking revolution shows that tourists are willing to adapt and increase their acceptance if they benefit from it.

To improve technology acceptance, Mlekus suggests that technology should be adapted to comply with stakeholders' beliefs (Mlekus et al., 2020). This showcases that to increase acceptance, it is crucial to understand what the customer wants and needs.



1.4. Reason for research

Ecotourism constantly evolves and must innovate to meet the challenges of the 21st century (Gurung and Scholz, 2008; Swarbrooke, 1999; Donohoe and Needham, 2006). Through the study, the researcher contributes to innovating ecotourism in the high-tech agricultural field. Furthermore, ecotourism mainly focuses on natural ecosystems (Donohoe and Needham, 2006; Blamey, 1997), however, the World is rapidly urbanising (Ritchie and Roser, 2018). This shows that ecotourism must find ways to implement itself in urban settings, such as through VF. Finally, although VF shows great theoretical promises, its low acceptance is hindering its successful implementation (Benke and Tomkins, 2017; Despommier, 2011; Jürkenbeck et al., 2019). Therefore, the study is a step towards increasing the success chances of VF.

1.5. Research goals

For the client: understand concrete actions that can increase the successful implementation of the VF concept linked to ecotourism.

For the researcher: provide some advice on how to enhance the acceptance of VF amongst ecotourists.

2. Analysis and diagnosis

2.1. Main Research Question (MRQ)

“What factors can influence the acceptance of vertical farming by ecotourists?”

2.2. Literature review

2.2.1. Introduction

To understand the factors that play a role in the acceptance of VF, the researcher used the *Unified Theory of Acceptance and Use of Technology* (UTAUT) (Soo Kang et al., 2011). The UTAUT assesses overall acceptancy by analysing performance expectancy, effort expectancy, and social influence (Oye et al., 2014). These variables are applied to the VF concept and the ecotourist population.

2.2.2. Performance expectance factors involved in the acceptance of VF by ecotourists

Performance expectance investigates if a system can achieve set goals (Oye et al., 2014). If VF does not bring environmental and social added value (Donohoe and Needham, 2006), it will score low in performance expectance.

It is unclear to ecotourists if VF contributes to the environmental bottom line. Therefore, sustainable views negatively affect the performance expectance of VF by ecotourists.

Sustainability is a pillar of ecotourism (Ramaswamy and Sathis Kumar, 2010; Donohoe and Needham, 2006), however, there seem to be disagreements if VF brings ecological added-value. Perceived sustainability was recognised as a key factor in achieving acceptance of VF (Jürkenbeck et al., 2019). However, individuals have a lack of knowledge on VF that leads them to make wrong assumptions about its ecological impacts (ibid). For example, people wrongly think that chemicals are necessary for VF processes (Yano et al., 2021). This lowers the acceptance of VF because individuals' subjective opinions take over the rational arguments supporting the fact that VF is a sustainable practice.

For individuals that are familiar with VF, opinions converge, because Academia disputes that VF is sustainable. For example, energy consumption was brought as a limitation of VF (Specht et al., 2019). The researcher understands that some ecotourists might question the sustainability impact of VF because Academicians themselves disagree.

VF is an urban practice, this conflicts with the original goal of ecotourism to be displayed in a natural environment. Therefore, the poor representation of nature negatively impacts the acceptance of VF by ecotourists.

Originally, ecotourism was described as activities linked to nature, which made the notion of “natural practices” essential (Donohoe and Needham, 2006; Blamey, 1997). The first interpretations suggested that there should be a complete immersion in natural ecosystems (Valentine, 1992). This represents a challenge for VF, which can be considered unnatural due to the soil-less practices, the use of LED lights, and the rapid robotisation of its practices (Muller et al., 2017; Chuah et al., 2019). This uncertainty is emphasized by the preference of open and green spaces practices when it comes to urban farming (Specht et al., 2016; Jürkenbeck et al., 2019).

However, these interpretations date from the 1990s, and the definition must be adapted to the current context. *The International Ecotourism Society* remains evasive on the topic (TIES, 2021), highlighting a possibility to widen the interpretation of the definition. The link between VF and



nature exists as the plant remains the core interest of VF. Therefore, VF could exceed the expectations of ecotourism by bringing the natural component to the urbanised World.

2.2.3. Effort expectance factors involved in the acceptance of VF by ecotourists

Effort expectance can be defined as the extent to which it will be easy for an individual to use the system (Oye et al., 2014). The more ecotourists are at ease while using VF, the more likely it is that they will accept it. That makes effort expectance a moderator variable to the acceptance of VF by ecotourists.

Discomfort while using VF reduces its ease of use on the psychological level. Therefore, technophobia reduces the effort expectance of VF by ecotourists.

As was illustrated in the introduction of this study, a commonly encountered factor of low acceptance of VF is the reluctance towards high-tech technology, also known as technophobia (Yano et al., 2021). If an ecotourist shows signs of technophobia, it would increase its effort expectancy, because it would psychologically be difficult for him/her to engage in high-tech-related touristic activities.

A study showed that 85% of the population suffered technophobia symptoms in the form of discomfort characterised by physical anxiety, nausea, sweating, gastrointestinal symptoms, restlessness, and more (Hou et Al., 2017; Osiceanu, 2015; Juby, 2021), however, it is uncertain to what extent this phenomenon touches ecotourists.

ecotourism used to be mainly practiced by highly educated individuals, however nowadays, it is spreading to lower educational levels. The literature offers opposed opinions when it comes to technophobia and educational level: while Wietgreffe supports that high education individuals tend to resist technology (Wietgreffe, 2018) Friederes supports the opposite (Friederes et al., 1983).

To conclude, it is uncertain if technophobia is present amongst ecotourists, however, it must be considered, as it is a recognised obstacle to VF. There is a high chance that many ecotourists are represented in the 85% of individuals experiencing technophobia according to Osiceanu's study (Osiceanu, 2015).

2.2.4. Social influence factors involved in the acceptance of VF by ecotourists

Social influence is the last component of UTAUT and it acts as a mediator in the acceptance of VF by ecotourists. Indeed, social influence refers to the degree that the user is influenced by his surroundings to use a system or not (Oye et al., 2014). Through the pillars of ethical responsibility and equal benefits (Donohoe and Needham, 2006), ecotourists consider their social impacts. Therefore, if VF tarnishes the social image of ecotourists, they will not engage with VF.

The elitism of VF is a social influence factor that negatively impacts its acceptance by ecotourists. This is because elitism is a construct that conflicts with the equal benefit pillar of ecotourism.

Through equal benefits, ecotourism attempted to reduce social inequalities (Donohoe and Needham, 2006). However, in practice, ecotouristic activities in preserved natural ecosystems are expensive due to the exclusiveness of the locations (Cater, 2006). For example, the preserved ecosystem of the Ranch at Rock Creek near Yellowstone features glamping lodge charged \$2200 to \$3200 per night (The Ranch at Rock Creek, 2021). These high prices associate a negative image of elitism to ecotourists. The elitist image of ecotourism is further reinforced by the mainly highly-educated profile of ecotourists (Wight, 1996).



Efforts should be made to reduce the elitist affiliation of ecotourism. However, VF goods currently have an elitist image because of their high prices (Specht et al., 2019). Therefore, VF currently reinforces an image of elitism that reduces the social image of ecotourism.

Employment practices of VF have consequences on the job market and especially the traditional farmers. This negatively impacts the social influence that is associated with VF.

In VF there is uncertainty as to who the farmer because the employees running a VF are mostly engineers or automated systems (Benke and Tomkins, 2017). Employment practices in VF conflict with ecotouristic-minded values of preservation and equal benefits.

Firstly, the replacement of low-entry jobs by highly skilled jobs and automated systems is a threat to the traditional agriculture employment model because it leads to lay-offs (Chuah et al., 2019). VF remains a labour-intensive industry that requires high employment needs for diverse and high-skilled workers (Despommier, 2013; Benke and Tomkins, 2017). However, these jobs require a level of education that is not usually achieved by the current workforce of traditional agriculture (ibid).

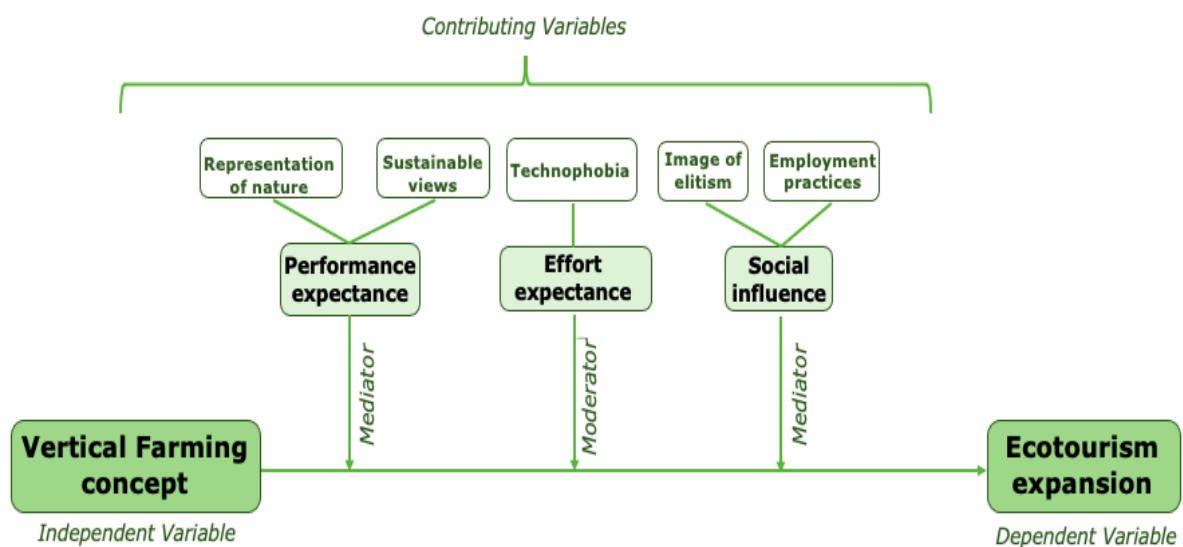
Secondly, in the reality of the 21st century, most traditional agriculture processes are robotised or linked to high-technology systems (Specht et al., 2016). However, in urban areas, there is a lack of knowledge regarding these farming advances, because most of the population keeps a romanticized yet outdated image of the farmer vehiculated by retailers, children's books, and farmer associations (Specht et al., 2019). VF which is located at the heart of urban hubs can be witnessed by all, and conflicts with the outdated traditional image of agriculture.

2.2.5. Conclusion

Through the literature review, the researcher aimed at understanding how the acceptance of VF was perceived by the ecotourists. The UTAUT model was used to gather the most relevant variables: by analysing patterns in the behaviours and the profile of ecotourists, and opposing those to the practices of VF, the researcher uncovered five factors that decrease the acceptance of by ecotourist: **sustainable views, representation of nature, technophobia, image of elitism and employment practices.**

A conceptual framework illustrates the relationships of the study concepts (Fig.2).

Fig.2: Conceptual framework





2.3. Methodology of stakeholder evidence

2.3.1. Research method

The researcher collected primary data through a survey (App.2) to understand if the scientific evidence uncovered in the literature review, is confirmed by the stakeholders. Through the research model and the deductive approach, the researcher aims at answering the following research questions (RQs):

RQ1: To what extent are the factor of low acceptance identified in the literature review confirmed by ecotourists?

- Sub-component 1.1: Representation of nature
- Sub-component 1.2: Sustainable views
- Sub-component 1.3: Technophobia
- Sub-component 1.4: Image of elitism
- Sub-component 1.5: Employment practices

RQ2: What are the most important factors of low acceptance?

- Sub-component 2.1: Priority order
- Sub-component 2.2: frequency of most recognised factors
- Sub-component 2.3: Other factors

2.3.2. Sampling

The population of interest is composed of ecotourists. Any tourist that has partaken in an ecotouristic activity in the past or plans on doing so can be considered an ecotourist (TIES, 2021). Ecotourism is mainly practiced by males (58%), and members of generation Y (aged 20 to 40) (TIES, 2000).

The latest data available reported that the ecotourist market generated \$92.2 billion, which was equivalent to 7% of the total tourism revenues. 7% of international tourists amounts to 93.57 million tourists (Correa, 2021).

The pool of ecotourist-minded individuals is 69% of international travellers. This is the percentage of travellers that exhibited a desire to travel according to the pillars of ecotourism in 2019 (Ecotourism World, 2021). Considering the focus on generation Y, that is a potential pool of approximately 266 million ecotourist-minded individuals.

Non-probability sampling, through convenience sampling, is used to collect valid data from ecotourists (Shlomo et al, 2013).

Considering the willingness to answer and the study constraints, the researcher expects at least 100 answers from ecotourist-minded individuals (Chia, 2021).

2.3.3. Data collection

The survey was designed via the application *ThesisTools*.

The researcher distributed the survey on high visibility social media platforms (Facebook, WhatsApp, LinkedIn, and Tumblr) (App.3) (Cremades, 2019). Moreover, social media appeal to ecotourists which facilitates convenience sampling (Ukpabi and Karjaluoto, 2017). The hashtags #ecotourist, #ecotourism, and #ecotravel are used to facilitate the spread of the survey to ecotourist-minded individuals.

The survey is also distributed to specific Facebook groups (Table.2). This group targeting also increases the reach to ecotourist-minded individuals.

The survey was distributed between 24 August and 14 September and the results were analysed using SPSS version 27.



Table.2: Groups consulted for the survey

Group name
Eco-tourism, people, and culture
HTH student sustainability initiative
Sustainable Future
Eco-tourism and wildlife students hang-out
Eco Tourism

2.3.4. Ethical data management

The research model follows the regulation of the *Netherlands Code of Conduct for Research Integrity* from 2018 (NAUAS, 2018). A Qualitative Data Informed Consent is added to the beginning of the survey to apply ethical management in the research design (App.4).

2.3.5. Limitations

Project constraints: A sample size calculator advised collecting 384 answers (Creative Research Systems, 2020). Due to the limited time available for this study, and the low willingness to answer, the minimum number of answers required is 100 (Chia, 2021). The large difference between the ideal and minimum number of answers highlights possible lower reliability.

Sampling reliability: Because the survey is shared on social media, the researcher does not have full control over who answers it. Therefore, there is a chance that an individual that does not belong to the population of interest answers the survey. To limit this undesirable outcome, question 3 of the survey “to what extent do you consider yourself ecotourism-minded?” will be further used as a filter.

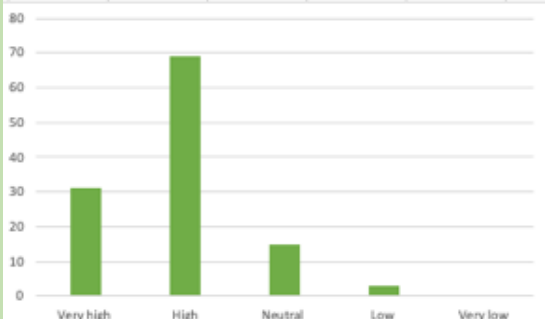
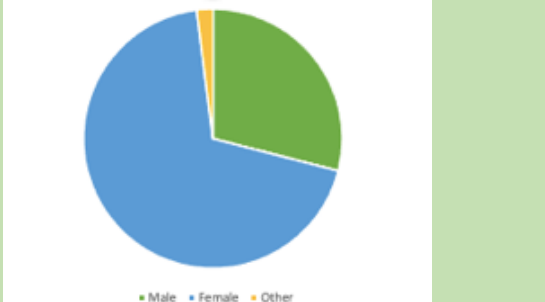
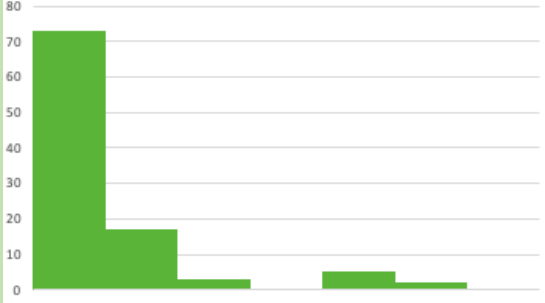
Factor relevance: Through the survey, the researcher aims at understanding to what extent the factors noticed in the literature review are valid. This limits the apparition of new patterns or paradigms. To improve this, an “other” option offers participants to add additional factors of low acceptance. The researcher considers an “other” factor relevant if at least 2 participants mention it.

Complex concepts: In the survey, some complex concepts such as acceptance, ecotourism, and VF are explored. This can lead to confusion amongst participants. To limit confusion, the researcher defined the concepts before the questions.

2.3.6. Research findings

Descriptive statistics were drawn through SPSS data analytics platform and displayed in Table.3. As per the sampling strategy, the researcher targets the ecotourist population, therefore conditioned filtering was used to exclude the responses of the 18 participants that selected an answer equal or lower to “neutral” for the question “To what extent do you consider yourself an ecotourist”. This explains why the number of respondents decreases from 118 to 100. The conclusions in Table.3 are true for the sample only; statistical tests were executed in 2.3.7 to generalise the findings for the population.

Table.3: descriptive statistics

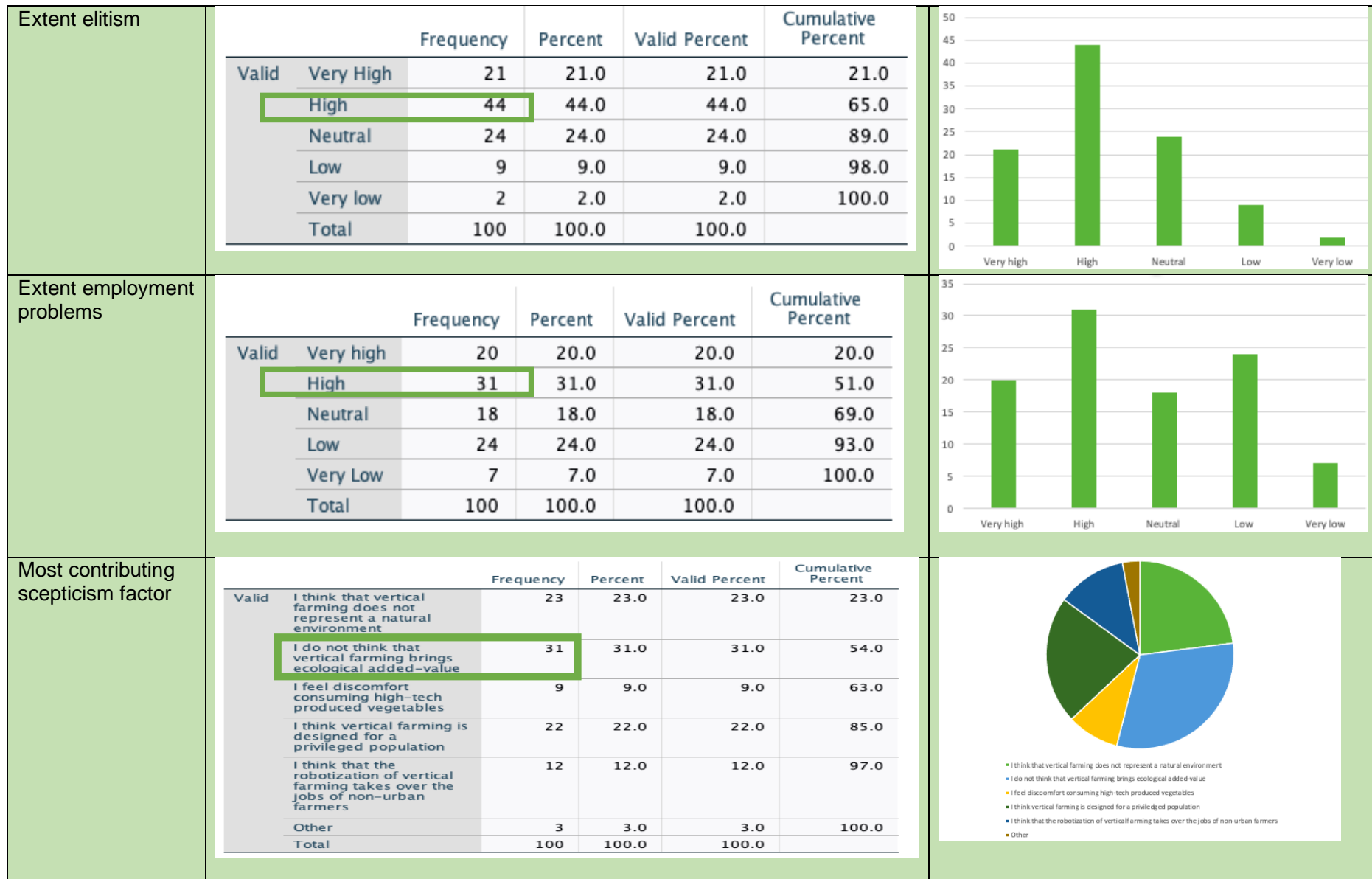
Variable	Frequency table (modes indicated in frame)					Visualisation
Extent of ecotourism		Frequency	Percent	Valid Percent	Cumulative Percent	
	Valid	Very High	31	26.3	26.3	
		High	69	58.5	84.7	
		Neutral	15	12.7	97.5	
		Low	3	2.5	100.0	
		Total	118	100.0	100.0	
Gender		Frequency	Percent	Valid Percent	Cumulative Percent	
	Valid	Male	29	29.0	29.0	
		Female	69	69.0	98.0	
		Other	2	2.0	100.0	
		Total	100	100.0	100.0	
Age		Frequency	Percent	Valid Percent	Cumulative Percent	
	Valid	18-25	73	73.0	73.0	
		26-35	17	17.0	90.0	
		36-45	3	3.0	93.0	
		46-55	5	5.0	98.0	
		56-65	2	2.0	100.0	
		Total	100	100.0	100.0	



Highest (or current) educational level	<table><tr><th></th><th></th><th>Frequency</th><th>Percent</th><th>Valid Percent</th><th>Cumulative Percent</th></tr><tr><td rowspan="5">Valid</td><td>High school equivalent</td><td>6</td><td>6.0</td><td>6.0</td><td>6.0</td></tr><tr><td>Bachelor's degree</td><td>43</td><td>43.0</td><td>43.0</td><td>49.0</td></tr><tr><td>Master's degree</td><td>44</td><td>44.0</td><td>44.0</td><td>93.0</td></tr><tr><td>Professional degree</td><td>3</td><td>3.0</td><td>3.0</td><td>96.0</td></tr><tr><td>Doctorate's degree</td><td>4</td><td>4.0</td><td>4.0</td><td>100.0</td></tr><tr><td>Total</td><td></td><td>100</td><td>100.0</td><td>100.0</td><td></td></tr></table>							Frequency	Percent	Valid Percent	Cumulative Percent	Valid	High school equivalent	6	6.0	6.0	6.0	Bachelor's degree	43	43.0	43.0	49.0	Master's degree	44	44.0	44.0	93.0	Professional degree	3	3.0	3.0	96.0	Doctorate's degree	4	4.0	4.0	100.0	Total		100	100.0	100.0		<p>■ None ■ Middle school equivalent ■ High school equivalent ■ Bachelor's degree ■ Master's degree ■ Professional degree ■ Doctorate's degree ■ Other</p>									
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		Master's degree	44	44.0	44.0	93.0																																															
		Professional degree	3	3.0	3.0	96.0																																															
		Doctorate's degree	4	4.0	4.0	100.0																																															
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Current occupation	<table><tr><th></th><th></th><th>Frequency</th><th>Percent</th><th>Valid Percent</th><th>Cumulative Percent</th></tr><tr><td rowspan="5">Valid</td><td>Employed</td><td>37</td><td>37.0</td><td>37.0</td><td>37.0</td></tr><tr><td>Student</td><td>58</td><td>58.0</td><td>58.0</td><td>95.0</td></tr><tr><td>Out of work</td><td>2</td><td>2.0</td><td>2.0</td><td>97.0</td></tr><tr><td>Other</td><td>3</td><td>3.0</td><td>3.0</td><td>100.0</td></tr><tr><td>Total</td><td></td><td>100</td><td>100.0</td><td>100.0</td><td></td></tr></table>							Frequency	Percent	Valid Percent	Cumulative Percent	Valid	Employed	37	37.0	37.0	37.0	Student	58	58.0	58.0	95.0	Out of work	2	2.0	2.0	97.0	Other	3	3.0	3.0	100.0	Total		100	100.0	100.0		<p>■ Employed ■ Student ■ Retired ■ Out of work ■ Other</p>														
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Total			100	100.0	100.0																																																
Familiarity with VF concept	<table><tr><th></th><th></th><th>Frequency</th><th>Percent</th><th>Valid Percent</th><th>Cumulative Percent</th></tr><tr><td rowspan="5">Valid</td><td>High</td><td>24</td><td>24.0</td><td>24.2</td><td>24.2</td></tr><tr><td>Neutral</td><td>23</td><td>23.0</td><td>23.2</td><td>47.5</td></tr><tr><td>Low</td><td>31</td><td>31.0</td><td>31.3</td><td>78.8</td></tr><tr><td>Very low</td><td>21</td><td>21.0</td><td>21.2</td><td>100.0</td></tr><tr><td>Total</td><td></td><td>99</td><td>99.0</td><td>100.0</td><td></td></tr><tr><td>Missing</td><td>System</td><td>1</td><td>1.0</td><td></td><td></td></tr><tr><td>Total</td><td></td><td>100</td><td>100.0</td><td></td><td></td></tr></table>							Frequency	Percent	Valid Percent	Cumulative Percent	Valid	High	24	24.0	24.2	24.2	Neutral	23	23.0	23.2	47.5	Low	31	31.0	31.3	78.8	Very low	21	21.0	21.2	100.0	Total		99	99.0	100.0		Missing	System	1	1.0			Total		100	100.0			<p>Very high High Neutral Low Very low</p>		
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Extent fake representation of nature	<table><tr><th></th><th></th><th>Frequency</th><th>Percent</th><th>Valid Percent</th><th>Cumulative Percent</th></tr><tr><td>Valid</td><td>Very high</td><td>13</td><td>13.0</td><td>13.0</td><td>13.0</td></tr><tr><td></td><td>High</td><td>36</td><td>36.0</td><td>36.0</td><td>49.0</td></tr><tr><td></td><td>Neutral</td><td>27</td><td>27.0</td><td>27.0</td><td>76.0</td></tr><tr><td></td><td>Low</td><td>22</td><td>22.0</td><td>22.0</td><td>98.0</td></tr><tr><td></td><td>Very Low</td><td>2</td><td>2.0</td><td>2.0</td><td>100.0</td></tr><tr><td></td><td>Total</td><td>100</td><td>100.0</td><td>100.0</td><td></td></tr></table>							Frequency	Percent	Valid Percent	Cumulative Percent	Valid	Very high	13	13.0	13.0	13.0		High	36	36.0	36.0	49.0		Neutral	27	27.0	27.0	76.0		Low	22	22.0	22.0	98.0		Very Low	2	2.0	2.0	100.0		Total	100	100.0	100.0														
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Extent comfortable eating robot produced goods	<table><tr><th></th><th></th><th>Frequency</th><th>Percent</th><th>Valid Percent</th><th>Cumulative Percent</th></tr><tr><td>Valid</td><td>Very high</td><td>11</td><td>11.0</td><td>11.1</td><td>11.1</td></tr><tr><td></td><td>High</td><td>31</td><td>31.0</td><td>31.3</td><td>42.4</td></tr><tr><td></td><td>Neutral</td><td>21</td><td>21.0</td><td>21.2</td><td>63.6</td></tr><tr><td></td><td>Low</td><td>21</td><td>21.0</td><td>21.2</td><td>84.8</td></tr><tr><td></td><td>Very Low</td><td>15</td><td>15.0</td><td>15.2</td><td>100.0</td></tr><tr><td></td><td>Total</td><td>99</td><td>99.0</td><td>100.0</td><td></td></tr><tr><td>Missing</td><td>System</td><td>1</td><td>1.0</td><td></td><td></td></tr><tr><td>Total</td><td></td><td>100</td><td>100.0</td><td></td><td></td></tr></table>							Frequency	Percent	Valid Percent	Cumulative Percent	Valid	Very high	11	11.0	11.1	11.1		High	31	31.0	31.3	42.4		Neutral	21	21.0	21.2	63.6		Low	21	21.0	21.2	84.8		Very Low	15	15.0	15.2	100.0		Total	99	99.0	100.0		Missing	System	1	1.0			Total		100	100.0			
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<p>Other contributing factors (summarized in categories after the arrow)</p>	<ul style="list-style-type: none"> • “It’s a lot of tech, energy, intrants (ultimately produced with fossil fuels), while ecological methods of farming e.g. food forests or permaculture are just as productive without all that. It just takes more time. The quality is better, there’s less energy involved and it contributes to the general quality of the environment.” → Sustainable views; representation of nature; harmful to biodiversity • “Low diffusion and application. And skills of workers employed might not match the standard required by the high-tech VF.” → Cost/Benefit ratio; Employment practices • “Farmers may not be able to pay for them which causes small farmers to go bankrupt.” → Cost/Benefit ratio; Employment practices • “Expensive, cannot cope with the demand that traditionally grown food can.” → Cost/Benefit ratio • “Who does it matters: a local company? A multinational? A private seller? The bigger it is, the more sceptic I am.” → Sustainable views • “The energy required for vertical farming to function (electricity ...) or the material required and their CO2 impact regarding their journeys also negatively impact the environment and should be taken into consideration.” → Sustainable views • “Not natural”. → Representation of nature • “Energy consumption” → Sustainable views • “I am very sceptic of using technology to solve problems” → Representation of nature • “Taste, genetically modified crop/seeds” → Reduced quality; harmful to biodiversity • “Lack of vitamins in the products” → Reduced quality • “I would need full transparency to be convinced” → • “Replacement of natural energy such as the sun” → Representation of nature • “It seems to me that it asks for much more ENERGY CONSUMPTION than it would in natural and normal environment” → Sustainable views
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2.3.7. Statistical tests

Statistical tests were executed to draw conclusions for the whole population through SPSS (App.5). The participants that do not consider themselves ecotourists have been filtered out of these statistical tests to preserve the validity of the sample. The conclusions of the statistical tests are summarized in Table.4.

Table.4: Summary of statistical test conclusions

Test Reference	Related RQ	Conclusion
App.5.1	Descriptive statistics	Ecotourists are mostly female, then males, then other genders.
App.5.2	Descriptive statistics	Ecotourists are mostly aged 18-25 years old, followed by 26-35 years old category. Other age categories are much smaller.
App.5.3	Descriptive statistics	Bachelor's degrees and master's degrees are majorly represented amongst ecotourists. There are very few doctorate's degrees, professional degrees, and high school equivalents.
App.5.4	Descriptive statistics	Most ecotourists are students or employed. A few ecotourists are out of work or have another occupation.
App.5.5	Descriptive statistics	Ecotourists consider themselves familiar with VF to a low extent.
App.5.6	RQ2.2;RQ2.3;RQ1.1	Ecotourists think VF is a fake representation of nature to a neutral extent.
App.5.7	RQ2.2;RQ2.3;RQ1.2	Ecotourists think VF is an ecologically friendly practice to a low-neutral extent.
App.5.8	RQ2.2;RQ2.3;RQ1.3	Ecotourists are comfortable consuming high-tech produced vegetables to a high extent.
App.5.9	RQ2.2;RQ2.3;RQ1.4	Ecotourists think VF is designed for a privileged population to a neutral-high extent.
App.5.10	RQ2.2;RQ2.3;RQ1.5	Ecotourists think that the robotized systems used in VF take the jobs of non-urban farmers to a neutral-high extent.
App.5.11	RQ2.1	Ecotourists think that VF not being an ecologically friendly practice is the most contributing factor to their scepticism towards VF.
App.5.12	RQ1.1;RQ1.2;RQ1.3;RQ1.4;RQ1.5	The gender of ecotourists does not influence their scepticism towards VF.
App.5.13	RQ1.1;RQ1.2;RQ1.3;RQ1.4;RQ1.5	To a small extent, the older an ecotourist is, the more he will be likely to think VF takes the jobs of non-urban farmers. Besides, the



		age of ecotourists does not influence scepticism towards VF.
App.5.14	RQ1.1;RQ1.2;RQ1.3;RQ1.4;RQ1.5	Master's degree students think that VF is designed for a privileged population to a lower degree than any other education levels. Besides, the highest education level of ecotourists does not influence their scepticism towards VF.
App.5.15	RQ1.1;RQ1.2;RQ1.3;RQ1.4;RQ1.5	The current occupation of ecotourists does not influence their scepticism towards VF.
App.5.16	RQ1.1;RQ1.2;RQ1.3;RQ1.4;RQ1.5	To a small extent, the more an ecotourist is familiar with VF the less he thinks VF is a fake representation of nature. Besides, the extent to which ecotourists are familiar with VF does not influence their scepticism towards VF.
App.5.17	RQ2.1	The gender of ecotourists does not influence the factor that most contributes to their scepticism towards VF.
App.5.18	RQ2.1	The age of ecotourists does not influence the factor that most contributes to their scepticism towards VF.
App.5.19	RQ2.1	The highest education level of ecotourists does not influence the factor that most contributes to their scepticism towards VF.
App.5.20	RQ2.1	The current occupation of ecotourists does not influence the factor that most contributes to their scepticism towards VF.
App.5.21	RQ2.1	The extent to which ecotourists are familiar with VF does not influence the factor that most contributes to their scepticism towards VF.



2.3.8. Conclusions and recommendations

Answering RQ1: To what extent are the factor of low acceptance identified in the literature review confirmed by ecotourists?

Statistical tests enabled to understand if the factors that were identified in the literature review were confirmed by stakeholders. Overall, not all factors were confirmed and recognised as increasing the scepticism of ecotourists regarding VF, and it seems that the degree varies per factor.

The technophobia factor was the only factor discredited by the survey outcomes (App.5.8), on average, ecotourists have a high threshold when it comes to consuming high-tech produced goods.

The fake representation of nature although not discredited, showed neutral results (App.5.6).

The statistical analysis enabled to confirm three paradigms of the literature review. Ecotourists find it neutral-high that VF is designed for a privileged population (App.5.9) and that VF has a negative impact on employment in agricultural industries (App.5.10). Moreover, ecotourists find it low-neutral that VF is an ecologically friendly practice (App.5.7).

In the analysis, the researcher also understood that demographic and psychographic attributes of ecotourist did not have a large impact on the extent to which they evaluate the acceptance factors. While gender and current occupation do not have any influence (App.5.12 & App.5.15), very small correlations were uncovered between age and the extent to which ecotourists think VF takes the jobs of non-urban farmers (App.5.13). Moreover, master's degree students have a higher acceptance of the image of elitism factor (App.5.14). Finally, to a small extent, the more an ecotourist is familiar with VF the less he seems to think that VF is a fake representation of nature (App.5.16).

Looking at the literature review, the researcher understands that the survey results conflict with the scientific evidence when it comes to the technophobia factor. The researcher hypothesises that the discrepancy lies in the fact that the age of ecotourists is lower than initially anticipated and younger generations have a higher acceptance of technology advances in general. The fake representation of nature factor, by being neither confirmed nor discredited, the researcher is not able to assuredly consider it as a factor that contributes to the scepticism of ecotourists towards VF. Finally, the scientific evidence is positively complemented by the stakeholder evidence to consider the image of elitism, the sustainable views, and the employment practices as factors that contribute to the scepticism of ecotourist towards VF.

Considering the UTAUT model, the researcher can complement the literature review by establishing that the social influence factors are most at play when understanding the acceptance of VF by ecotourists; followed by the performance acceptance category. But more importantly, as technophobia was not recognised a contributing factor, the effort acceptance category does not affect the acceptance of VF by ecotourists.

Answering RQ2: What are the most important factors of low acceptance?

The researcher was able to identify what ecotourists thought to be the most contributing factor to their scepticism towards VF (App.5.11). The outcomes of the test pointed out that all factors were represented in unequal proportions, which shows that a priority order can be drawn. Looking at the frequencies, the researcher concludes that the most recognised factor of scepticism is the sustainable views factor. Followed by the fake representation of nature and the image of elitism and finally, the technophobia factor was recognised as the least contributing factor.

For ecotourists, demographics and psychographic attributes such as age, gender, highest educational level, current occupation, and extent of familiarity with VF do not influence the likeliness of ranking one of the factors above another (App.5.17-App.5.21). This highlights the fact that scepticism of the ecotourist population towards VF finds its roots causes in deeper behavioural and psychographic attributes that were not considered. Besides, several ecotourists pointed out that other factors contributed to their scepticism towards VF, such as reduced quality, harmful to biodiversity and the low cost/benefit ratio.

Going back to the literature overview, the researcher was able to refine the analysis by establishing a priority order between the factors of low acceptance of the ecotourist population.



While paradigms were identified, the researcher was not able to uncover the scale and effect size of each factor through the current methodological design.

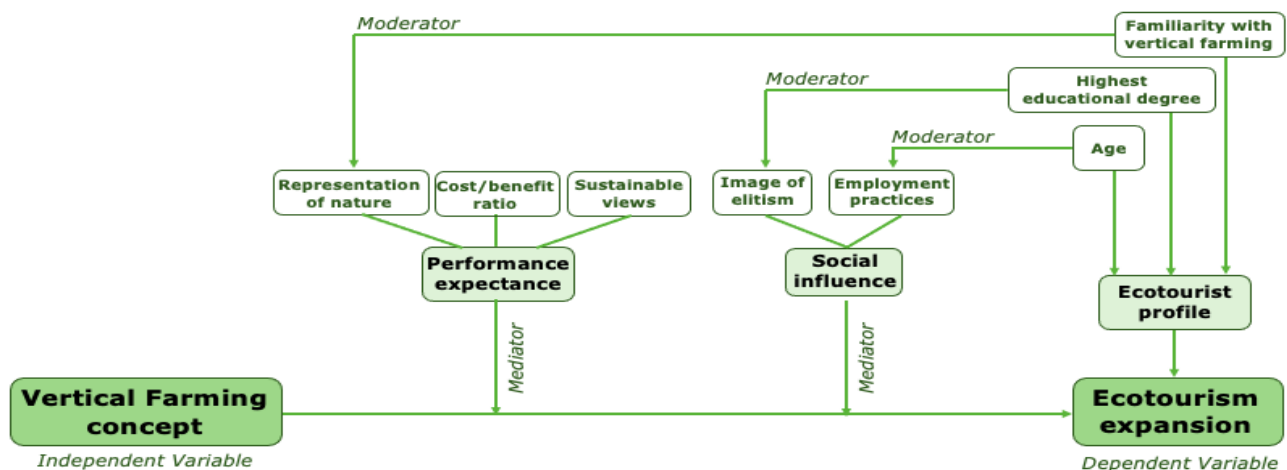
Answering the MRQ: What factors can influence the acceptance of VF by ecotourists?

The image of elitism, the sustainable views, and the employment practice, which were paradigms discovered in the literature review, were confirmed through stakeholder evidence. On the other hand, previously identified factors of technophobia and fake representation of nature were discredited and do not seem to contribute to the non-acceptance of VF by ecotourists. A priority order was also identified between all factors which highlight the priority to resolve the sustainable views factor. Additionally, the survey results enabled to discover a new factor of influence: the low cost/benefit ratio, which belongs to the performance category of the UTAUT model and relates to the ethical responsibility pillar of ecotourism. To conclude, the performance and effort factors in the UTAUT model most influence the acceptance of VF by ecotourists.

Besides, when it comes to the profile of the ecotourist, the researcher discovered very small correlations between demographic and psychographic attributes and the acceptance of factors. But overall, the researcher concludes that more deeply rooted personal attributes probably impact the acceptance of VF by ecotourists.

As an overall takeaway, the researcher was able to revise the conceptual framework (Fig.3).

Fig.3: Revised conceptual framework



The conclusions highlight an overall low perception of sustainability (both social and environmental). This conflicts with the actual benefits of VF that were uncovered in the introduction (such as its benefits in water management, role in providing employment, or role in providing equal access to food in different parts of the World).

The researcher concludes that disinformation hinders VF and a clear lack of education on its advantages negatively impacts the perception that ecotourists have of the concept. Better educating the ecotourist market on VF will enable to break down the misconceptions on VF, which is the first step towards improving its acceptance.

The researcher recommends focusing on the sustainable views, the image of elitism, and the employment practices, as these were recognised factors that contribute to the scepticism of ecotourists towards VF. The cost/ratio benefit by showing uncertain results could be discussed, although it does not represent a priority. Finally, based on the profile of the ecotourist, the researcher recommends focusing on students aged 18-25 years old.

The researcher recommends focussing on the educative pillar of ecotourism to resolve the problem: by educating ecotourist students aged 18-25 years old, on the notions of social and environmental sustainability, the researcher will spark their interest while giving them the tool to form an unbiased opinion about the concept.



3. Solution Design

3.1. Design process

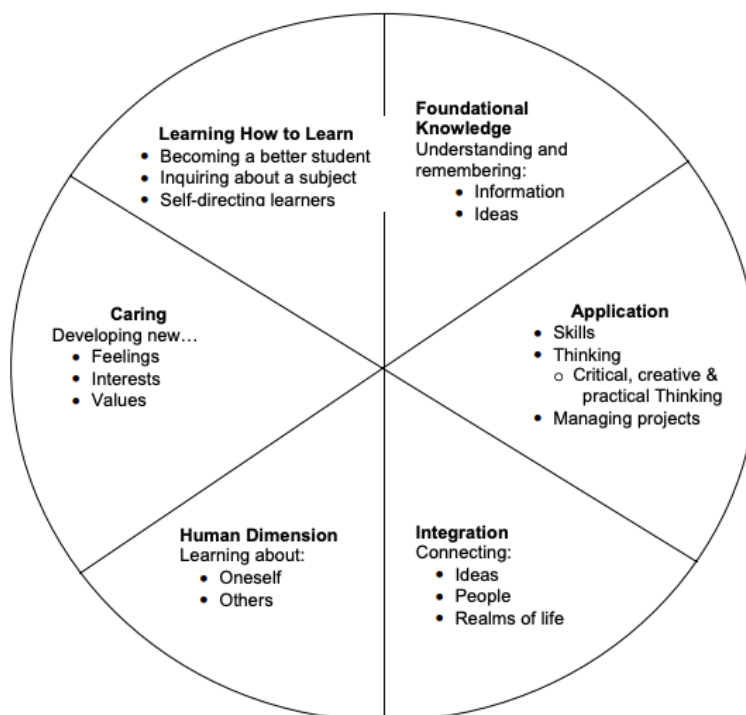
From the statistical test outcomes, the researcher understands that most of the ecotourists are students and that a majority of ecotourists are familiar with VF to a low extent.

From the literature review outcomes, which were confirmed through the statistical testing, there is much disinformation amongst ecotourists regarding the ecological impact of VF: most would agree that VF is ecologically not worth it due to LED energy costs and chemical pollution.

However, these respondents fail to consider the recognised advantages of VF when it comes to water management, arable land use, and reduced transportation needs (Benke and Tomkins, 2017; Banerjee and Adenauer, 2014; Yano et al., 2021). The same can be said regarding the employment practices, where ecotourists do not consider the high employment needs in high technology of VF, and the elitist image that does not consider the progress brought forward by VF to preserve agriculture in all parts of the World.

To fit the student characteristics and the recommendation that followed the methodological design, the researcher imagines an educative module as a potential solution to break down misconceptions on VF. The educative module will comply with the model of the *Taxonomy of Significant Learning* (TSL) by Dee Fink, to ensure maximum learning efficiency (Fink, 2003)(Fig.4). Moreover, an educative module solution links to the findings of the situational scan, that ecotourists can show resilience in acceptance if they are properly shown the benefits of a concept.

Fig.4: TSL



By addressing students in general, a learning module will target both ecotourists and non-ecotourists individuals. This entails that the researcher will not be able to quantify how many ecotourists will receive the solution; however, the fact that students match the demographics of ecotourists ensures that sufficient ecotourists will be affected by the learning module.



3.2. Solution draft

3.2.1 Methodology

The researcher organised a focus group (App.6) on 18/11/2021 with targeted stakeholders from Hotelschool the Hague (HTH): Marjan de Jong (teacher and co-founder of the SDG community at HTH), Francesco Filipetti (student and aspiring VF entrepreneur), and Gemma Gisy (student, ecotourist and member of HTH's sustainable community and beekeeping club).

The aim was to build a draft of what the learning module could look like. Focus groups are fast and efficient processes to collect practitioner and stakeholder evidence (Krueger, 2014). By providing a sense of group, the participants are more likely to share their problems and possible solutions, while keeping spontaneity by reacting to the answers of others (Onwuegbuzie et al., 2009).

The yielded data were analysed using the *Constant Comparison Method* (App.6). This consists of isolating the relevant data, grouping it in colour-coded categories, and creating themes gathering the relevant categories (Strauss, 1987). Table.5 depicts the overview of the categories and themes of the focus group.

Table.5: Analysis overview of the focus group

Themes	Categories
Pre-module activities	Time capsule
	Homework
Learning activities	Visit of VF
	VF implementation at HTH
	Jigsaw method
Assessment activities*	Jigsaw method
	Time capsule
	Final deliverable
Other	Aim of module
	Teaching style
	Module implementation**
	Future steps*

*Information also used in Chapter 5

**Information also used in Chapter 4.2

3.2.2 Module content

The proposed learning module (Fig.5) consists of three distinctive phases:

The **pre-module** phase aims at introducing the students to the concept of VF while checking their original thoughts about the concepts.

The **module** phase will feature the actual activities that will increase the knowledge of the students on the concept of VF.

Finally, the **assessment** phase will enable the module-owner and the researcher to draw conclusions on the efficiency of the whole procedure.

Table.6 depicts all the activities comprised within the phases. These activities were inspired by the researcher's original solution ideas, which were refined in the co-creation process (de Jong, Gisy and Filipetti, 2021) and supported by adequate scientific research.

Table.6: Activities

Phase	Step	Activity	Objective	Explanation	Activity owner	Target audience
Pre-module	1	Introductory email/ module syllabus	Transmitting the reasons for the module and the technical	The syllabus is a crucial component for any learning module as it is the most formal means of communication between an instructor and a student when it comes to the course's structure, content and specificities (Eberly et al., 2001). By providing, beforehand, the deliverable overview, course structure, aim of the course and time commitment, the researcher aims at increasing the student's morale, through clear communication (Garavalia et al., 1999).	Lecturer	Students
	2	Time capsule creation	Capture the initial thoughts of the students concerning VF	Time capsules are linked to the idea of leaving an unchangeable trace in the present, that can be found and analysed in the future (Jarvis, 2015). The idea, suggested by Gemma Gisy in the focus group, will enable to perform a before/after assessment upon the module completion, to understand the evolution of opinions of students regarding VF.	Students	/
	3	Introductory resources (App.7)	Provide initial; information about VF to spark an interest amongst ecotourist students or potential ecotourist students	Although reading lists provide useful information on a topic, up to 80% of university students do not read them (Deale and Lee, 2021). To resolve this, the focus group participants advised to focus on a one-pager, infographics or videos, which are more engaging materials (Renfro, 2017). Sending introductory resources will also be an opportunity for the researcher to vehiculate targeted content on sustainable views, employment practices and image of elitism.	Lecturer	Students
	4	Forming of Jigsaw groups	Define groups that will build an expertise on a VF related topic	The Jigsaw teaching method, suggested by Mrs de Jong, is a participative teaching method, in which the student is in charge of his/her own learning and the other student's learning (Resor, 2008). Besides improving self-esteem, group relationships and attitude, the Jigsaw method has shown to motivate students to consult the recommended materials (ibid).	Lecturer Students	/

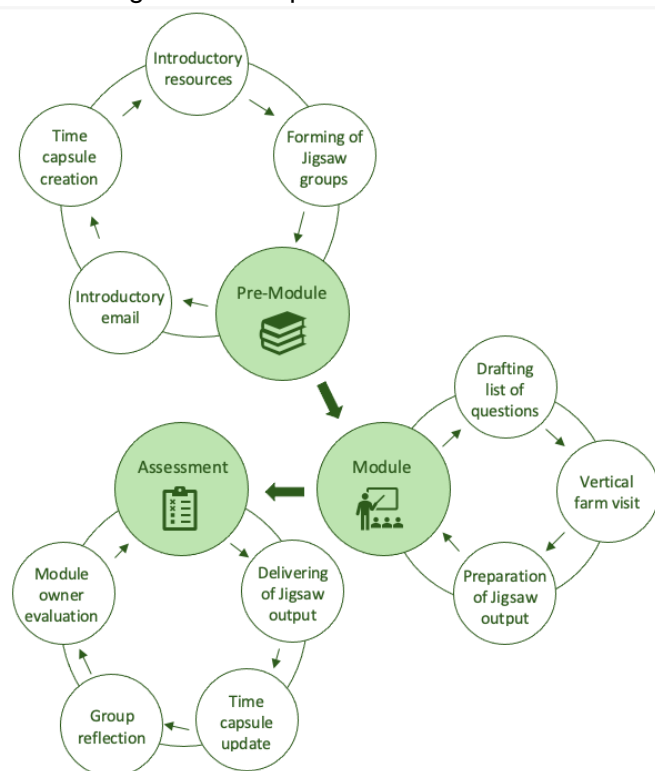


				<p>This will ensure a higher interest towards the specific content that the researcher wishes to vehiculate in the introductory resources.</p> <p>The Jigsaw topics must be diverse to avoid repetition of knowledge between groups, which can lead to boredom and loss of focus according to the focus group outcomes. Potential topics include the triple-bottom line aspects, the history of VF, the best practices, and the future of VF. Here, it is important to remember the targeted topics, outcomes of the research: the sustainable views will be the core of the research for the Environmental bottom-line Jigsaw group. Similarly, the image of elitism and employment practices will need to be covered by the Jigsaw group dealing with the People bottom-line.</p>		
Module	5	Drafting of questions	Initial phase of preparation where the students gain understanding on their topic of expertise	in the Jigsaw process, students will have to define the future needs to be answered, to have the complete overview of their topic of expertise linked to VF.	Students	/
	6	VF visit	Direct exposure to the concept of VF to understand it better and find the answers to their questions	<p>A field trip to a VF will enable students to receive direct input for their Jigsaw presentations and will also enhance their reflection, facilitate their meaning-making and help them to connect more easily to the novel concept of VF (Stern and Powell, 2020).</p> <p>As per the focus group, the visit of the VF could include a tasting workshop, which will facilitate the deconstruction of misconceptions on the taste and quality of VF products.</p>	VF employees	Students Lecturer
	7	Preparation of Jigsaw output	Finalise the expert presentations	In the Jigsaw process, the students will have to use the knowledge gained during the visit, as well as their desk research to finalise their presentations.	Students	/
Assessment	8	Delivering of Jigsaw output	Educate the other students on a specific area linked to VF	In the Jigsaw process, the students will get the chance to educate their peers by delivering summary presentations on all the relevant topics that are linked to VF.	Students	Students Lecturer



	9	Time capsule update	Capture the thoughts of the students about VF after exposure to the VF concept	Closing the time capsule experiment by asking the students to write a statement on their opinion regarding VF and comparing it with their original thoughts. This will provide a form of before/after assessment on the effect of the module on the student's opinions. (Barends, 2021)	Students	/
	10	Group reflection	Debate to understand how the opinion of students have evolved, and what consideration they have about VF after understanding the concept better	A debate to close off the module is the perfect opportunity to tackle the subjects of sustainable views, employment practice and elitism. After all their exposure to VF, the researcher believes that the students will have built a sufficient knowledge to discuss these topics and express a reliable opinion unclouded from an initial lack of knowledge.	Students Lecturer	/
	11	Module owner evaluation	Build an understanding of the module's impact on students after completion of the module	The researcher and lecturer must understand to what extent the module bears an impact in the mind of the students. More information is provided in Chapter 5.	Lecturer	(Researcher)

Fig.5: Learning module steps



3.2.3 Reflection on proposed module

The aim of the solution was to deconstruct misconceptions about VF through education. This is achieved by the draft learning module. The focus of the solution was the misconceptions regarding ecological sustainability, employment practices, and elitism. These subjects will be tackled as they are key considerations for the Jigsaw topics of the people bottom-line and planet bottom-line, as well as being directly discussed in the introductory resources and group reflection step. Moreover, it can be noted that the solution proposed exceeds expectations by considering the cost-benefit ratio factor in the profit bottom-line Jigsaw topic.

Another aim of the solution was to target ecotourists, which is achieved through the choice of targeting students aged 18-25 years old, that match the key demographics of ecotourists as per the research outcomes.

Finally, the proposed solution complies with the TSL model (Table.7), which is a foundational model in educational design (Fink, 2003), and increases its feasible implementation.

Table.7: Overview of TSL elements linked to proposed solution

TSL component	Application explanation
Foundational knowledge	The foundational knowledge is transmitted through the Jigsaw method where students educate each other. The knowledge is supported by selected resources and the knowledge of the Wageningen students
Application	The students by owning the responsibility of a topic of expertise can display the knowledge acquired
Integration	The project connects two major universities in the Netherlands, which will enable both people and ideas to mix and learn from each other



Human dimension	Students learn about themselves and others when working together in groups. This is further supported through group feedback
Caring	The solution is aimed at better understanding VF, which is motivated by sustainable values and answers the problems of tomorrow in a responsible way. The module therefore transmits sustainable values to its participants
Learning how to learn	The solution is designed in progressive way students are encouraged to take ownership of their learning progress

Overall, the researcher concludes that all set objectives set are met through the solution, which makes it valid.



4. Implementation

4.1. Location

The researcher when looking for a pilot location considers undergraduate and graduate institutes, which best fit the demographics of the targeted group (Sharma, 2015). Furthermore, introducing a VF-based learning module is a novel and hyper-complex decision which means that there are limited benchmarks and there is a need for an empirical pilot test approach (Barends, 2021). In this context of uncertainty, universities have the advantage of already possessing educative resources that facilitate the implementation process (Sharma, 2015).

The researcher will utilise HTH to test his solution. HTH has two campuses with identical courses, which means the solution can be introduced simultaneously on two campuses (Hotelschool The Hague, 2021b). The institution of Higher Education fits the project for the following reasons:

- **Values:** The values of HTH include openness, sustainability, and integrity (Hotelschool The Hague, 2021b) that link to the pillars of ecotourism. Moreover, HTH focuses on F&B structures and therefore has an interest in VF as it could be an ideal sustainable supplier for its outlets. Finally, with the newly added beehives and taste lab in the campuses of HTH, the researcher understands that the school seeks to follow its vision of “creating hospitable structures” through an empirical and practical approach, which matches VF (Hotelschool The Hague, 2021b).
- **Stakeholders:** HTH enjoys an extended network of students, alumni, lecturers, the local community, and others (Hotelschool The Hague, 2021b). These stakeholders are aligned with the characteristics of the ecotourist market. They have an interest in sustainable practices, they understand ecotourism and their profile align: mostly 18-25 years old with an educational background, knowledge in the tourism industry, and the financial means to travel.
The researcher aims at utilizing the knowledge of relevant stakeholders in the design, action, and evaluation parts. For example, the members of the HTH sustainability committee and the SDG/CE committee.
Moreover, the students of HTH study hospitality, therefore they can directly grow an interest towards expanding VF to ecotourism, which is an objective of this study.
- **Teaching methods:** The progressive methods of teaching are already implemented in numerous courses of HTH, with the concept of Jigsaw methods and the flipped classrooms (Hotelschool The Hague, 2021b; Focus Group). This facilitates the implementation as the learning-module owners are already familiar with these teaching tools.

When it comes to the visit of a VF during the learning module, the focus group outcomes suggested considering visiting the *Wageningen University* in the Netherlands. The university boasts VF facilities (GreenTech, 2017) and there are expert students on the topic of VF. Receiving the knowledge from the students of Wageningen will be a form of peer-teaching which holds benefits for the HTH students, as it boosts their participation, but also for the *Wageningen* students presenting, as it boosts their autonomy, motivation, critical thinking, collaborative and communication tools (Stigmar, 2016).



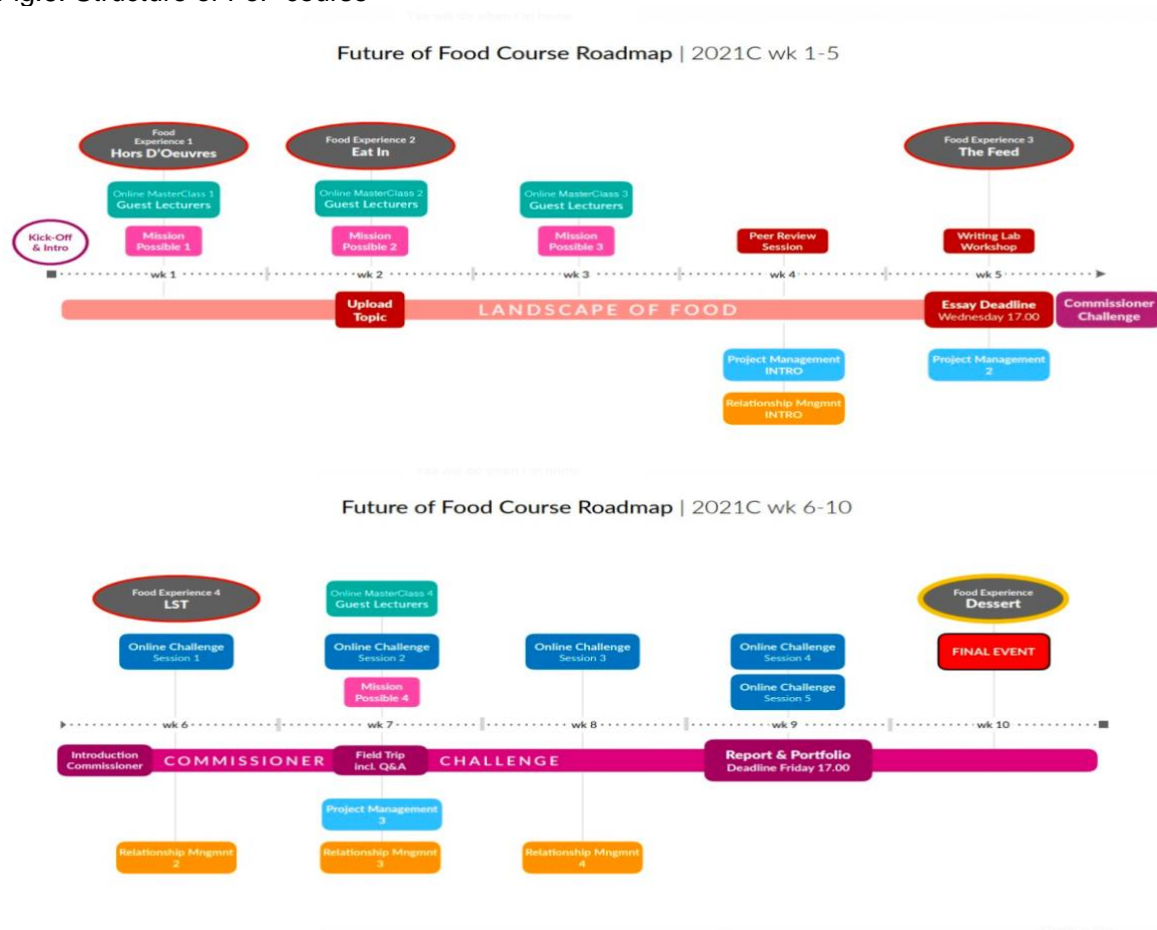
4.2. Time

Out of all the courses offered at HTH (App.8), the imagined solution fits best with the course *Future of Food* (FoF) from the bachelor's programme, as confirmed through the focus group; *Circular thinking in the Hotel Ecosystem* from the master's programme and *Hospitality Experience Design* from the MBA's programme. Indeed all these courses are future-orientated and involve elements of innovation, sustainability, and/or food production and consumption (Hotelschool The Hague, 2021a).

As a pilot project consists of delivering the solution in one unique setting (Zbrodoff, 2012), the researcher narrows down the project to FoF, which best fits the theme of VF. Moreover, at HTH, in 2020 567 students entered the bachelor's programme or the International Fast-Track programme and 150 students on average participated in FoF each block; whereas only 25 students entered the master's programme (Hotelschool The Hague, 2021a; Ling, 2021). The fact that there are 22 times more bachelor's students compared to master's students highlight the advantage of focusing on the larger group to test the module.

FoF is provided alongside all other minors twice per academic year. The course lasts 10 weeks and its structure is described in Fig.6 (FoF Core Team, 2021). The proposed learning module should be integrated into "the Feed" in the fifth week of FoF, dealing with the challenges of feeding an increasing population (Ling, 2021).

Fig.6: Structure of FoF course





4.3. Communication plan

To ensure maximum efficiency of the pilot implementation, there will be a need to effectively communicate the instructions and technical information to the module-owners: lecturers of FoF. The following actions will be taken:

- The solution and research outcomes were kindly introduced to Ms Williams, core team of FoF, by the research commissioner Ms de Jong in December 2021. Ms Williams positively reacted to the learning module concept and objectives. The researcher will further discuss the feasibility and implementation of the learning module with Ms Williams, Mr Gallicano and Mr de Vos, the three core team members of FoF.
- Feedback from the lecturers will be implemented to perfect the solution outline and content.
- The course will be provided for the first time by the researcher and the lecturer together.
- The solution will be evaluated (Chapter 5).
- When all necessary changes are implemented, the ownership of the module will switch completely to the lecturers.

4.4. Financial information

The low cost (Table.8) and high potential of the solution for the values and development of HTH induces a positive cost/benefit ratio, which increases the feasibility and positive impact of the proposed solution (Barends, 2021).

Table.8: Estimated costs

Item	Estimated cost
Learning module design	Free; designed by the researcher
Visit of VF	Free; as part of a cooperation with another university
Tasting	1,14€ per participant*
Staffing costs	Included in lecturer's salary; free for Wageningen student guides, as part of their education learning

*For a tasting of salad and leafy greens; a traditional salad and a pack of leafy greens cost 1€ each and can be shared amongst ten students (AHnl, 2021). VF produced goods costs 4,7 times more than traditional farming (Tasgal, 2019), which brings the cost to 4,7€ for a salad and leafy greens to be shared by 10 students. Price= $(2 \times (1 + 4,7)) / 10 = 1,14$.



5. Evaluation

5.1. Criteria to assess

The solution is a pilot, therefore it tests the feasibility of a concept, to understand how this product can be improved in its content and shape (Zbrodoff, 2012). Table.9 describes the different criteria that must be assessed in the evaluation process (Butcher et al., 2019). Once the criteria are assessed, the researcher will be able to identify the potential of the solution and consider subsequent implementation (Nordstrom, 2009). If most measures provide a negative effect, it is advised to reorganise co-creation sessions to understand how to improve the solution or consider discontinuing it (ibid).

Table.9: Criteria to be assessed

Criteria		Explanation	KPIs associated
Direct effect of the solution	Retention of the knowledge	Information retention creates tacit knowledge that can be widely spread thus create awareness on VF (Mohajan, 2016)	-Jigsaw presentations -Number of references to VF in future work
	Reducing misinformation	Understand if the misconceptions about VF have been deconstructed	-Time capsules -Average score for: "To what extent do you consider yourself familiar with VF?"
	Acceptance of VF	The objective of the solution is that ultimately there is an increase in the acceptance of VF	-Average scores for: "To what extent do you consider VF to be an ecologically friendly practice?"; "To what extent do you think VF is designed for a privileged solution?" -Participation rate -Group reflection outcomes -number of references to VF in future work
Effectiveness of the learning method		Measuring to what extent the method used in the learning module is an enabler of the objectives	-Jigsaw presentations -Score on opinion about the course -Participation rate -Number of questions on instructions
Value of the solution		Measuring to what extent the solution influences its environment on a broader scale.	-Number of VF projects worldwide and ecotourism VF projects -Revenue generated by VF -Global acceptance score of VF



5.2. Measurement tools

Jigsaw presentations: The quality and number of details used in the Jigsaw presentations, gives a clearer idea of the extent to which students have assimilated the information regarding VF.

Time capsules: The tool is comparable to a before-after assessment (Barends, 2021). The students express an opinion about VF without the preparation exposure, and the end measure of the capsule showcases how much the opinion of the student has evolved. The test shows positive results if the student shows an evolution in his/her behaviour towards the development of VF and is able to provide unbiased judgement on the concept.

Group reflection outcomes: The debates that will arise from the learning module contain numerous qualitative data that give an idea to the module-owner of the perception of the audience regarding VF. This data can be recorded for future analysis.

Number of references to VF in future work: Data mining can be performed on the database of the media centre of HTH to scan for mentions of VF in the works of the HTH students (Laudon and Laudon, 2017). The measure shows positive results if the number of references increases at each measure.

Average scores/global acceptance scores: The execution of a quasi-experiment can be used to evaluate the solution (Barends, 2021). A baseline measurement is taken by distributing an adapted version of the methodology survey to two groups of students, the FoF population and another group of students (App.2). After the minor, both groups are retested on their acceptance via the same survey. The result is positive if there has been an improvement of the average scores in the FoF group. The more the difference is great with the independent, the more effective the module was.

Participation rate/number of questions on instructions: The module owner can count the number of questions and enquiries regarding VF that were asked during the module. This figure can be compared to the regular modules, to understand to what extent the module has led to improved participation levels compared to other learning modules. Similarly, the module owner can count the number of questions on the instructions to understand to what extent the Jigsaw method was hard to execute. The fewer enquiries on instructions the better the solution format is.

Score on opinion of the course: A simple measure at the end of the module can be taken to assess the overall opinion of the students with regards to the learning module. To execute this measure, the module owner and researcher can make use of the HTH course feedback form, which is commonly used to assess blocks at HTH.

Number of VF projects worldwide/ecotourism VF projects: Through web mining, the researcher can track how many projects of VF and ecotourism VF are emerging (Laudon and Laudon, 2017). Several measures will enable to map out the evolution. Particularly interesting would be to pinpoint the creation of VF within the schools that boasted the VF learning module. Although this long-term factor is not fully dependent on the solution efficiency, pinpointing schools will enable to increase the causation ratio.

5.3. Future steps

If the results of the assessment tools show positive outlook for the solution and the perception of VF by the HTH community, some steps will have to be taken to expand the idea within and outside the boundaries of HTH. In case of positive results, the first step will be to implement the pilot test within the curriculum (Zbrodoff, 2012). As per the focus group, other steps could include the extension of the module to other courses of HTH such as Circular Thinking in the Hotel



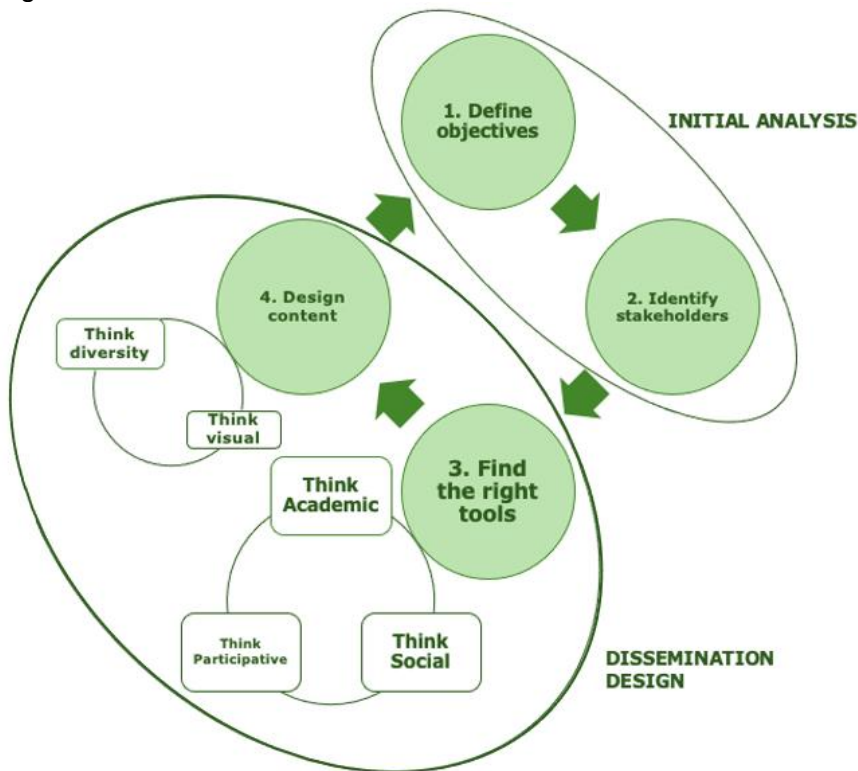
Environment, which is a course offered in the Master's programme, or Hospitality Experience Design, from the MBA programme (Hotelschool The Hague, 2021c; de Jong, Gisy and Filipetti, 2021).

Other future steps could include the expansion of the module to other universities that have an interest in hospitality & tourism, circular economy, or agriculture. Finally, the most ambitious project that could be launched in the future if the HTH community responds positively to the module, would be to launch a VF project within the campus (de Jong, Gisy and Filipetti, 2021). Depending on the financial aspirations of the project, this indoor VF could be considered a project for LYCar students or in a more casual setting, similar to the beehive club, that was launched in 2020 at HTH (Hotelschool The Hague, 2021b; *ibid*).

6. Dissemination

To maximise efficiency, the researcher translated the ten steps to innovative dissemination (Ross-Hellauer et al., 2020) into the project dissemination model (PDM) (Fig.7).

Fig.7: PDM



6.1. Initial Analysis

Define objectives: in this step, the researcher asks himself why there is a need to disseminate (Ross-Hellauer et al., 2020).

→ By disseminating his results, the researcher indirectly influences the knowledge of individuals, which impacts their behaviour and decision-making processes in the social, political, and economic spheres (Akin and Scheufele, 2017; Marín-González et al., 2017). The researcher disseminates his results in interest to creating a behavioural change when it comes to ecotourism and agricultural methods. The researcher also aims at increasing the acceptance of VF by ecotourists and increasing the successful implementation of VF-based ecotourism concepts. Besides, the researcher acknowledges that not disseminating represents a waste of time and effort used in the project (Derman and Jaeger, 2018).

Identify Stakeholders: mapping the audience, with their characteristics and reason of involvement enable the researcher to prioritize the process of dissemination and align the contents to the appropriate channels of communication (Ross-Hellauer et al., 2020).

→ Based on the dissemination objectives, the researcher identifies the stakeholders of the dissemination process as the ecotourists, the urban farm/VF employees, the educative entities, the hospitality businesses, and the academicians. A persona is created for each stakeholder group, which includes characteristics and stake in the project (Fig.8)

Fig.8: Stakeholder personas





Stakeholder group: Academician

Name: Jenna Wilkins

Age: 52

Preferred channels of communication:



Stake in the project:

"I am interested in the project because the data collected in the literature review and in the survey further the opened discussion about vertical farming. Furthermore, in the survey, the profile of the ecotourist was updated and refined, which enables future researcher to better understand the characteristic of this group. Overall, the research project can now be a steppingstone for future projects."

Interest of the researcher:

By disseminating to academicians, the researcher creates awareness on vertical farming amongst academicians and encourages more work to be completed on the topic.



Stakeholder group:
Hospitality business

Name: Viola Fleming

Age: 31

Preferred channels of communication:



Stake in the project:

"Our customers always want more innovation! Especially nowadays with all the trends expanding in the field of ecotourism, we need to find ways to diversify our offer. We have thought of implementing vertical farming but were quite unsure of how accepted it was, so I am interested to read what solutions there are to increase this acceptance, so we can innovate."

Interest of the researcher:

Hospitality business are the primary consumers of this research, by using the research outcomes, they will increase the use of vertical farming in their own structures and thus spread the concept to the society at large.

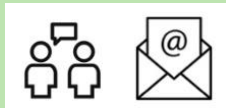


Stakeholder group:
urban farm/VF employees

Name: Steve Clay

Age: 28

Preferred channels of communication:



Stake in the project:

"Vertical Farming is the core of my business, so anything that can increase its visibility is welcomed. I also believe there are a lot of ways that I can expand my business and collaborate with hospitality businesses. Eventually, diversifying offers spreads my concept!"

Interest of the researcher:

Urban farms and VF employees are essential stakeholders of this research as they are direct customer to the solutions that will improve their business.

6.2. Dissemination Design

Finding the right tools: The researcher needs to design the message and align it with the most appropriate channel (Ross-Hellauer et al., 2020). While doing so, the researcher must always remember to respect diversity and to create the content in an attractive format (ibid). For example, visual tools enable to bridge the gap between academicians and civilians by presenting complex ideas in a manageable manner (Renfro, 2017).

Content design: Based on the characteristics of the target audience the researcher designed dissemination acts to connect to his stakeholders:

- **Academic publication:** The research report was posted on Academician and public database Researchgate.net and the HTH archives (LYCar core team, 2020; Resta et al., 2010) (App.9). These databases are chosen because they are open access, which means the student researcher can publish without additional fees; moreover (ibid). Databases of journal articles are often consulted by **Academicians** (Resta et al., 2010); this will enable to address of the Academician stakeholder group.
- **Social media use:** A blog post that summarizes the outcomes of the research in a visual and concise manner was created (App.10). To finalise the follow-up of the survey, the blog post is shared on the Facebook groups used to distribute the survey. Social media improve the fast and immediate share of information (Buckarma et al., 2017). To improve the specific targeting of **ecotourists**, use hashtags (#verticalfarming; #ecotourist; #ecotourism). Finally, although mostly ecotourists are targeted through this method, the blogpost will also affect any member of the society at large that reads it, enabling accrued spread.
- **Private sharing:** The blog post designed for social media has been adapted to be shared individually with 15 up-and-coming **VF businesses**, mainly located in the Netherlands (App.11). Privately sharing the research outcomes with these companies increases their knowledge of the targeted market. It also enables these businesses to correct their practices to improve the market and approach the relevant audiences.



- **HTH alumni network:** The research outcomes were shared on the alumni platform of HTH to reach **hospitality minded people** (App.12). The research aims at planting seeds of innovation within HTH alumni that also happen to share numerous characteristics with the ecotourist population (as per the research outcomes).
- **FoF research website:** Thanks to the kind involvement of Ms de Jong, the researcher can submit his research paper as a part of the FoF research website, accessible to all students of HTH, but more specifically **ecotourists** of the FoF course and the **educative bodies** behind the website.
- **Oral dissemination:** Through the co-creation session on 18/11/2021 and the LYCar event, planned for January 2022, the researcher directly communicates his research findings to targeted groups. Moreover, the research outcomes were presented to Ms Williams, **lecturer** at HTH by Ms de Jong, to identify the feasibility of an implementation within HTH. Furthermore, the commissioner of this research aims at organising an urban farming event, in which the researcher will be able to present his findings. This event will be held on the 13th of January 2022 and will be an optimal occasion to receive direct feedback from **VF businesses, educative bodies, hospitality professionals, academicians, and ecotourists**. Finally, the learning module solution will be an optimal tool to keep on orally disseminating semester after semester to **ecotourists** and **educative bodies** of HTH.

Through his dissemination acts, the researcher was able to achieve great reach; especially on ResearchGate, where the publication was consulted by 106 people (including 41 full-reads) as of 12/12/2021 (App.13). Although the social media publication did not yield many reactions, the researcher received some encouraging comments (App.14), this was like the emails sent to VF start-ups (App.15). Overall, the dissemination met its objectives to spread awareness of the research outcomes. The researcher points out that the project could have benefited from additional comments on the content and what could be improved.



7. Academic reflection

7.1. Reflection on research topics

7.1.1. Concepts, literature, and paradigms

Due to the novelty of the concept, the researcher had to deal with limited scientific evidence (Barends, 2021; Gupta and Ganapuram, 2019). Especially for the literature, all evidence had to be confirmed through a stakeholder-orientated methodology and thus it increased the risks of incorrect interpretations (Barends, 2021). Moreover, the researcher deplores the low amount of research available on VF and ecotourists. This limited the multiplication of paradigms on factors hindering the acceptance of VF by ecotourists. This limits the study, as some factors might be left undiscovered.

These observations also highlight the value of the research project: the researcher positively contributed to the knowledge available on VF, creating opportunities to refine future related research projects.

7.1.2. Stakeholder needs

By adding knowledge to a novel concept, the stakeholder needs are met: future scholars will be able to elaborate their literature overview, which is a necessary foundation in any academic research project (Boote and Beile, 2005), although the lack of paradigms must be considered by future Academician as a limitation of this research project.

Moreover, the knowledge of the project led to the solution design that tackles the needs of ecotourists, educative bodies, urban farming, and VF business and hospitality businesses. An opportunity for diversification that creates demand, and generates supply thus brings added value.

It can be noted that before generalising the contribution of this study, it will require a proper evaluation. By deconstructing misconceptions on VF, the project improves acceptance of VF, although more work must be executed to perfect acceptance of VF.

7.2. Reflection on used methodology

The elaboration of the literature review was based on scientific evidence and practitioner knowledge of hospitality and VF. With the survey, the Academician's point of view was confronted and verified. This has enabled to collect data from multiple sources, which ultimately strengthens the weight of the arguments (Barends, 2021).

The choice of executing a survey induced a quantitative approach (Sekaran and Bougie, 2003). This approach is relevant because, as the concept of the research is novel and complex, and the literature sources of inspiration were scarce, there was a need to generalise the outcomes of the scientific evidence to a wider population. Thus, the survey is powerful in its ability to be easily spread and generate numerous data (ibid). Moreover, an advantage of the quantitative approach is the irrefutable interpretation of the outcomes. This limits biases that could emerge from the opinions of the researcher in a qualitative methodology (ibid).

Some methodological challenges include the use of a questionnaire that limits the apparition of new paradigms due to limited choices (Sekaran and Bougie, 2003). Furthermore, after completing the survey and its analysis, the researcher notes that several limitations must be considered to carefully use the outcomes of this study:

- The sample size of 118 participants is valid within the imposed conditions of the research projects, however, it is inferior to the sample size advised to draw conclusions on population level.



- Despite a clear effort to spread the survey to the whole ecotourist population, the use of social media draws more attention from younger populations (Pew Research Center, 2021), which might induce some uncertainty regarding the generalisations made on the age and current occupation of the ecotourists.
- While the chi-square goodness-of-fit enabled the researcher to understand if the variables are equally distributed or not (Snedecor and Cochran, 1989), there are no available tests to provide a mean estimate for each value.

7.3. Implications for future research

7.3.1. Setting changes for the research

Needs for future research naturally arise from the research outcomes of the project. The settings of the project were focused on the population of ecotourists. However, the objectives of spreading awareness on VF do not limit themselves to the field of ecotourism. The population of interest could be shifted to understand how the acceptance differs from population to others and thus complete the initial objective of increasing the acceptance of VF.

Currently, the project based its analysis on understanding a population sorted through psychographic segmentation, and especially, through the ecotourism lifestyle trait of segmentation (Tynan and Drayton, 1987). It was discovered after the research, that the variables used did not showcase relevant segmentation of the ecotourist population when it comes to scepticism towards VF. The researcher identifies examples of the best potential variables of interest to further the research in Table.10.

Table.10: Variable settings of interest for the development of VF

Segmentation category (Tynan and Drayton, 1987)	Variable	Explanation
Demographic	Age	Age affects the social perception of VF: different age groups have different behaviours in the adoption of new technologies (Chen and Chan, 2011).
	Income	As seen earlier, VF is often considered elitist due to high prices (Specht, Siebert, et al., 2016). This must be considered to properly address individuals with varying level of incomes.
Geographic	Place of origin / current country	Agriculture and culture are often linked and hard to dissociate; therefore, perception decreases when the heritage conflicts with the new advances (Banks, 2004).
Psychographic	Diet habits	The more people are concerned by eating vegetables, the more they will take in interest in sustainable manners of producing it. Moreover, through the reduction of pesticides and the optimised used of nutrients (Despommier, 2011), VF generates interest for those with high vegetable intake diets.
Behavioural	Benefits sought	Depending on the factors that influence customer behaviour in the purchase of vegetables (e.g., price, quality, distance to selling location, appearance...)(Chikkamath et al., 2012), the interest in VF varies. Because it does not cater proportionally to all these benefits.



7.3.2. Needs for extended research

The research outcomes clearly show that although VF is an attractive concept, much more research must be accomplished to make it a viable concept. To lead the way in the agricultural methods of the future, research on VF should focus on:

Furthering the research on the ecological added-value: The water management and the location advantage of VF installations unquestionably improve the ecological bottom line in the field of agriculture (Benke and Tomkins, 2017). However, the use of energy-powered lighting and aeration systems negatively impacts UNSDG 12 on responsible consumption and production (Wong et al., 2020; United Nations, 2019). As noticed earlier in the analysis, these impacts generate Academician and stakeholder doubts regarding the ecological added value of VF (Specht et al., 2019). This highlights the need for future research in establishing what is currently the most ecological manner of producing vegetables, and how can the VF consumption of energy be best improved.

Integrating VF and traditional agriculture: As seen throughout this research, VF shakes society by deconstructing the romanticized image of agriculture (Jürkenbeck et al., 2019). Moreover, some people fear that through its robotised systems, VF redesigns the jobs within the field of agriculture (Chuah et al., 2019). These uncertainties highlight the need for the development of an integrated approach that would bind VF to the current agricultural methods rather than developing VF and traditional agriculture separately.

Developing the profile of the ecotourist: while this research focused on VF linked to ecotourism, it is important to highlight the fact that the ecotourism market represents a large share of the touristic demand (O'Connor, 2018; CREST, 2018). Future research on the profile of the ecotourist can be performed to understand how the tourism and hospitality industry can best adapt to this profile and keep on diversifying towards reaching customer needs and wants.



8. Appendices

App.1: Proposal grade form

LYCar Proposal Grading Rubric

U.1.1 (Version LYCar 2020; 16 February, 2021)

Student Name:	Tanguy Pechoultre de Lamartinie	LYCar Coach:	Ms. Gikas
Student Number:	672055	Primary PLO:	9
Date Submitted:	29/06/2021	Secondary PLO(s):	2, 10

Note: All boxes with red border to be filled by student

Preconditions (required for assessment)	Yes	No	Comments
Checks content and completeness			
Executive Summary is present, concise, can be read independently, contains information about process and content, focuses on results and outcomes	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
LYCar Proposal meets formal reporting criteria (according to e.g., LYCar Reading & Writing Guide)			
LYCar Proposal is written in English and is professional, including common basic components such as Intro, ToC, Conclusion etc.- see Reading & Writing Guide	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
LYCar Proposal is max. 5.000 words (counting after Table of Content, incl. text in tables) - visual proof of wordcount is included in Appendices.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Harvard Referencing Style is used consistently, referencing to primary sources only, List of References is well presented	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Check (technical) formalities and submissions			
Ephorus upload	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
LYCar Proposal incl. Appendices are uploaded in Osiris	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Ethics and data management			
Ethical, integrity and data management requirements	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Entitled to assessment? (All yes above required):	<input checked="" type="checkbox"/>		



DD1: The student has demonstrated knowledge and understanding in a field of study that builds upon their general secondary education, and is typically at a level that is supported by advanced textbooks

		Excellent	Pass	No Go
1.1 Use of literature and knowledge of the field		Student uses in-depth literature and knowledge of the field throughout the report. The report contains no mistakes and factual incorrectness.	Student uses in most cases literature and knowledge of the field in the report. The report contains some mistakes and factual incorrectness in a limited part of the report.	No sufficient or correct use of literature and knowledge of the field in the report. The report contains mistakes and factual incorrectness.
		Student takes all significant factors into account and looks from different perspectives, sees patterns, relates situations to concepts in order to solve larger problems. The reports show excellent thinking capacity of the student. New unique insights presented in the topic and depth of understanding displayed. Excellent linking between the elements and the underlying issues within the case situation.	Student takes different perspectives into account. The report shows intellectual depth (taking into account all significant factors and looking from different perspectives) in most parts of the report. Some patterns are clear. Some links have been made.	The report lacks intellectual depth (superficial and merely descriptive) in some parts of the report. Patterns are not sufficiently made clear.
1.2 Intellectual depth and abstract thinking				
Student Feedback:	Excellent	<input checked="" type="checkbox"/>		
	Pass	<input type="checkbox"/>		
	Not Yet	<input type="checkbox"/>		
Assessor Feedback:	Excellent	<input type="checkbox"/>		
	Pass	<input checked="" type="checkbox"/>		
	Not Yet	<input type="checkbox"/>		

All sections of the report contain diverse literature. All comes from journal articles, most of which are peer-reviewed journals. An effort was made to select up to date sources. All assumptions are verified through a source coming from an academic journal or an industry example. Scope is well defined and the distinction between ecotourism and the other forms of tourism is made. The same is made regarding vertical farming and other urban farming methods. New insights are provided by analysing the link of vertical farming and ecotourism (which was never done before). The new insights are drawn from a real synthesis effort of what literature says.

Student demonstrates indepth knowledge of the subject, backed by literature. Patterns can be identified and are underpinned. Challenge will be to take the results and link this literature to the outcomes

DD2: The student can apply their knowledge and understanding in a manner that indicates a professional approach to their work or vocation, and has competences typically demonstrated through devising and sustaining feedback and solving problems within their field of study

		Excellent	Pass	No Go
2.1 Application of theories/models to situations at hand		Student uses a range of theories/models appropriate to the problems in the case skilfully and able to add their own unique perspective and insight. They own the model(s).	Student mentions a range of theories/models appropriate to the problems in the case and applying some of them in the correct way.	Mentioning models and theories but not using them in a correct way.
		Student plans evaluation of impact and meaning of own work in relation to business and industry with sound underpinning. Identification of all stakeholders and acts of dissemination. Plan on how to effectively disseminate knowledge through different channels fitted for a variety of audiences is also presented.	Student formulates criteria for evaluation. Student describes possible impact and meaning of own work. Identification of stakeholders and planning of dissemination through at least one valuable channel with an audience is presented.	Student fails to describe criteria how to evaluate impact. No identification of stakeholders or realistic plan on dissemination of knowledge through at least one valuable channel with an audience.
2.2 Possible impact and meaning of own work - dissemination of research				
Student Feedback:	Excellent	<input checked="" type="checkbox"/>		
	Pass	<input type="checkbox"/>		
	Not Yet	<input type="checkbox"/>		
Assessor Feedback:	Excellent	<input checked="" type="checkbox"/>		
	Pass	<input type="checkbox"/>		
	Not Yet	<input type="checkbox"/>		

The UTAUT model is correctly applied. Which flows into a personal conceptual framework. The link between literature review and models/conceptual framework is clear. Examples of tourism are used throughout to illustrate why the study has its application in the industry. The major stakeholders are identified (target market, who is concerned). The researcher shows how the dissemination will be done to these stakeholders in relevant and applicable ways.

Models in place and good conceptual framework, again the challenge is to go back and re-evaluate the framework once the research is done. Dissemination in place



DD3: the student has the ability to devise data gathering events, gather and interpret relevant data (usually within their field of study) to inform judgements that include reflection on relevant social, scientific or ethical issues

	Excellent	Pass	No Go
3.1 The Design Based Research Process	Student sets the research process up in a systematic and well organised way. Student makes sense of a problem mess, analyses a (complex) problem and formulates feasible solutions by using a design-based research approach. Logical flow from Problem definition to Analysis to Solutions Design/methods are well chosen and motivated,	Student analyses the problem, and formulates possible solutions underpinned by literature using a design-based research approach. Methods motivated and mostly logically chosen	Insufficient problem analysis and methodology, research cycle not used.
3.2 Analysis and evaluation of data	Student plans analysis and evaluation of data/information well using appropriate (digital) tools and makes data-driven decisions. All statements are underpinned with facts and figures and/or referencing. The appropriate tools are used in all steps. Analysis is sufficiently complex with use of information from more than 2 different dimensions (practioners, scientific literature, the organization and stakeholders).	Student plans analysis and evaluation of solutions clearly, with some flaws or unclarities. Some statements are underpinned with facts and figures and/or referencing, some lacking underpinning. Analysis is sufficiently complex using data from at least one dimension and sufficiently backed up with literature.	Plan of analysis and evaluation of solutions is not clear. Statements are mostly not underpinned with facts and figures and/or referencing; some are contradicting. No tools are used. Lacking or no analysis and not backed up with literature.
Student Feedback:	Excellent <input checked="" type="checkbox"/> Pass <input type="checkbox"/> Not Yet <input type="checkbox"/>	The DBR cycle can be found through the structure of the report and is constantly used as reference in all chapters. Methodology explains in details all te decisions that are taken, and the steps made to avoid bias as much as possible. Ethical data management is applied. Information is derived from stakeholder, organiational, scinetific and practioner evidence.	
Assessor Feedback:	Excellent <input checked="" type="checkbox"/> Pass <input type="checkbox"/> Not Yet <input type="checkbox"/>	Both the research process and methdology has been worked out extensively	

DD4: the student can communicate information, ideas, problems and solutions to both specialist and non-specialist audiences

	Excellent	Pass	No Go
4.1 Communication to audience making use of professional (business) English	Student divides information effectively in paragraphs/chapters. No noticeable errors in English usage and mechanics. Use of language enhances the argument and avoids abbreviations. Sentence structures are well varied, and voice and tone are highly suitable for the specific audience/s. Style and content complement each other into an appealing, high quality story. Highly skilful organisational strategy. The logical sequence of ideas increases the effectiveness of the argument and transitions between paragraphs strengthen the relationship between ideas. Sub-headings are employed effectively and the links between different sections are reinforced through linking expressions. Shows attention to detail in all parts of the report.	Student divides information in paragraphs/chapters. Errors in English usage and mechanics are present, but they rarely impede understanding. Use of language supports the argument. Sentence structures are varied, and voice and tone are generally appropriate for the intended audience/s. Generally, a clear organisational strategy. The sequence of ideas in most cases supports the argument and transitions between paragraphs clarify the relationship between ideas. The report is mainly comprehensively written and lacks some attention to detail in some parts of the report.	Distracting errors in English usage are present and they impede understanding. Use of language is basic, only somewhat clear and does not support the argument. Word choice is general and imprecise. Voice and tone are not always appropriate for the intended audience/s. Basic organisational strategy, with most ideas logically grouped. Transitions between paragraphs sometimes clarify the relationship among ideas. The report is not comprehensively written and lacks attention to detail in most parts of the report.
Student Feedback:	Excellent <input checked="" type="checkbox"/> Pass <input type="checkbox"/> Not Yet <input type="checkbox"/>	Pargraphs and chapters organise the thought process. There are no/ or minor English mistakes. All parts are wel structured using formal language and quality-writing syntax.	
Assessor Feedback:	Excellent <input type="checkbox"/> Pass <input checked="" type="checkbox"/> Not Yet <input type="checkbox"/>	Biggest challenge is to ensure that student can explain to non specialists, so keep remembering that they do not have the extensive background	



DD5: the student has developed those learning skills necessary to continue to undertake further study with a high degree of autonomy

	Excellent	Pass	No Go
5.1 Plan on IQ development in PLO: Reflection on product(s)	Student has clear plans on what will be delivered and uses different relevant theory to underpin own work and reflect on it.	Student has a plan on what will be delivered and uses theory to underpin planned own work and reflect on it.	No clear deliverables mentioned and almost no theory to underpin own work and reflection.
5.2 Plan on AQ & EQ Self development	Student devises excellent ability to critically reflect on own developmental goals and demonstrates real growth mindset for life-long learning. Student proposes a demonstration of being able to self-direct, taking initiative in unpredictable situations. Student shows different metrics that can demonstrate development in terms of their EQ/AQ.	Student shows developmental goals and demonstrates growth mindset. There is a plan on how to reflect on values, attitudes and behaviour. Starting levels and desired end levels are described and measurements are provided.	Developmental goals are not concrete, there is no demonstration of growth mindset. Plan on how to reflect is vague and does not give enough substantiation to show growth.
5.3 Plan on EQ Social development	Student provides a plan on how to construct a multitude of proof that shows development as an Intercultural Hospitality Leader. Excellent ability to contribute to the global society/local community as a responsible citizen. Excellent analysis of diversity of people the student will deal with. Possible effective collaboration with all stakeholders in different cultural settings. Hospitality is key to the project or work the student does.	Student provides a plan on how to prove development as an Intercultural Hospitality Leader. Plan on how to contribute to the global society/local community as a responsible citizen. Proposing ideas on how to collaborate with different stakeholders in different cultural settings. Hospitality is a differentiator in the students' project or work.	No clear plan on development as an Intercultural Hospitality Leader. Plan on how to contribute to global society/local community is missing. Ideas proposed on collaboration or hospitality are not sufficient.
Student Feedback:	Excellent <input checked="" type="checkbox"/> Pass <input type="checkbox"/> Not Yet <input type="checkbox"/>	<p>PLO's are mentioned and the researcher explains how they apply to the study.</p> <p>The AQ and EQ self-development is analysed and learning goals are formulated. Methods are developed to show how to reflect on progress and assess the EQ/AQ development. Several metrics are used to assess the development of EQ/AQ. Sam applies to the Multicultural Hospitality Leadership components.</p>	
Assessor Feedback:	Excellent <input type="checkbox"/> Pass <input checked="" type="checkbox"/> Not Yet <input type="checkbox"/>	Student will have to look at this critically once placement is in place	

Overall Assessor Feedback

Overall good LYCar Proposal, clear set up and solution to be created and evaluated.

LYCar Proposal Outcome

Excellent	<input checked="" type="checkbox"/>	All qualitative criteria awarded a "Pass" and at least <u>three</u> qualitative criteria awarded a "Excellent"
Pass	<input type="checkbox"/>	All qualitative criteria awarded a "Pass". "P" registered in Osiris. Student can continue with LYCar execution.
No Go	<input type="checkbox"/>	One or more qualitative criteria graded as "Not Yet". "F" registered in Osiris. Student re-writes LYCar Proposal with incorporated feedback.
Pre-Condition NY	<input type="checkbox"/>	Pre-conditions not met. Student resubmits LYCar Proposal. No grade or feedback provided to the student.



App.2: Survey Design

1. What is your gender?
 - Male
 - Female
 - Other
2. What is your age? (open answer)
3. What is your educational level?
 - No schooling
 - Middle school equivalent
 - High school equivalent
 - Bachelor's degree
 - Master's degree
 - Professional degree
 - Doctor degree
 - Other (open answer)
4. What is your current occupation?
 - Working
 - Student
 - Retired
 - Out of work

Ecotourism can be defined as touristic activities with environmentally and socially friendly practices

5. To what extent do you consider yourself an ecotourist?
 - Very high
 - High
 - Neutral
 - Low
 - Very low
6. To what extent do you consider yourself familiar with the concept of vertical farming?
 - Very high
 - High
 - Neutral
 - Low
 - Very low

Vertical farming is an agriculture method that relies on a high-tech controlled environment (e.g., soil-less, artificial lights, robotised systems) to produce vegetables and leafy greens in urban indoor structures.

7. To what extent do you think that vertical farming is a fake representation of nature?
 - Very high
 - High
 - Neutral
 - Low
 - Very low
8. To what extent do you think vertical farming bring ecological added value?
 - Very high



- High
 - Neutral
 - Low
 - Very low
9. To what extent do you feel anxiety symptoms at the idea of consuming vegetables produced through high-technology?
- Very high
 - High
 - Neutral
 - Low
 - Very low
10. To what extent do you feel that vertical farming is an elitist practice?
- Very high
 - High
 - Neutral
 - Low
 - Very low
11. To what extent do you think that the robotised systems in vertical farming take the jobs of farmers?
- Very high
 - High
 - Neutral
 - Low
 - Very low
12. Are there any other factors that increase your scepticism towards vertical farming? (open answer)
13. Which of the statements selected in question 4 contributes the most to your scepticism towards vertical farming?
- I think vertical farming does not represent a natural environment
 - I do not think that vertical farming brings ecological added value
 - I feel discomfort engaging with vegetables produced by high-tech means
 - I think that the pricing of vertical farming reinforces it as an elitist practice
 - I think the robotisation of vertical farming takes over the jobs of farmers
 - Other (open answer)

App.3: Social Media message



Dear ecotourist enthusiast,
I am a student currently finishing my Bachelor at Hotelschool The Hague in The Netherlands.
I need your help to collect some data on ecotourist opinion on vertical farming, which is the subject of my thesis. Here is the link to my survey, it should take approximately 3 to 5 minutes to complete, on the secured website ThesisTools. And of course, the data collected will be kept anonymous and will only serve the purpose of my thesis completion.
Thank you so much for your help!
Tanguy



App.4: Quantitative Data Informed Consent

Thank you very much for agreeing to participate in this survey.

You, as the survey respondent, declare you are 18 years old or over and recognise that your participation is voluntary, and you may withdraw from this research at any time.

This survey investigates the factors that contribute to the low acceptance of vertical farming amongst ecotourists.

The information provided by you in this questionnaire design will be used for student research purposes leading to the award of a Bachelor's degree in Hospitality Management at Hotelschool The Hague, Netherlands (Brusselselaan 2; 2587AH The Hague – The Netherlands).

The data will not be used in any manner which would allow identification of your individual responses.

Anonymised research data will be archived at Hotelschool The Hague Media Centre Database, to make such data available/accessible to other researchers in line with ethical data sharing practices.

Should you be interested in the results of this study, please contact Researchprojects@hotelschool.nl .



App.5: Statistical test outcomes

App.5.1: Test variable gender (nominal) → Chi Square goodness-of-fit

The researcher assumes the population is equally distributed amongst males and females. Therefore, the proportion of genders to be tested is 0,33.

H0¹: The proportion of males is 0,33

H1¹: The proportion of males is not 0,33

H0²: The proportion of females is 0,33

H1²: The proportion of females is not 0,33

H0³: The proportion of other is 0,33

H1³: The proportion of other is not 0,33

What is your gender?

	Observed N	Expected N	Residual
Male	29	33.3	-4.3
Female	69	33.3	35.7
Other	2	33.3	-31.3
Total	100		

Test Statistics

What is your gender?	
Chi-Square	68.180 ^a
df	2
Asymp. Sig.	.000

a. 0 cells (0.0%) have expected frequencies less than 5. The minimum expected cell frequency is 33.3.

P-value = .000 < .005

→ Accept H1¹, H1² and H1³: the genders are not proportionally distributed. Looking at the frequencies, the most represented gender is females, followed by males and other genders only represent a small percentage.

**App.5.2: Test variable age (ordinal) → Chi Square goodness-of-fit**

The researcher assumes the population is equally distributed amongst ages. Therefore, the proportion of all age category is tested to be 0,143 which represents an exact proportionality.

H0¹: The proportion of >18 is 0,143

H1¹: The proportion of >18 is not 0,143

H0²: The proportion of 18-25 is 0,143

H1²: The proportion of 18-25 is not 0,143

H0³: The proportion of 26-35 is 0,143

H1³: The proportion of 26-35 is not 0,143

H0⁴: The proportion of 36-45 is 0,143

H1⁴: The proportion of 36-45 is not 0,143

H0⁵: The proportion of 46-55 is 0,143

H1⁵: The proportion of 46-55 is not 0,143

H0⁶: The proportion of 56-65 is 0,143

H1⁶: The proportion of 56-65 is not 0,143

H0⁷: The proportion of 65+ is 0,143

H1⁷: The proportion of 65+ is not 0,143

What is your age?

	Observed N	Expected N	Residual
18-25	73	20.0	53.0
26-35	17	20.0	-3.0
36-45	3	20.0	-17.0
46-55	5	20.0	-15.0
56-65	2	20.0	-18.0
Total	100		

Test Statistics

What is your age?	
Chi-Square	182.800 ^a
df	4
Asymp. Sig.	.000

a. 0 cells (0.0%) have expected frequencies less than 5. The minimum expected cell frequency is 20.0.

P-value = .000 > .05

→ Accept H1¹, H1², H1³, H1⁴, H1⁵, H1⁶ and H1⁷: the ages are not proportionally distributed. Looking at the frequencies, the most represented are 18-25 years old, followed to a smaller extent by 26-35 years old and to an even smaller extent by 46-55 years old, 36-45 years old and 56-65 years old.

App.5.3: Test variable highest educational level (nominal) → Chi Square goodness-of-fit



The researcher assumes the population is equally distributed amongst highest occupational levels. Therefore, the proportion of all highest educational levels category is tested to be 0,125 which represents an exact proportionality.

H0¹: The proportion of none is 0,125

H1¹: The proportion of none is not 0,125

H0²: The proportion of middle school equivalent is 0,125

H1²: The proportion of middle school equivalent is not 0,125

H0³: The proportion of high school equivalent is 0,125

H1³: The proportion of high school equivalent is not 0,125

H0⁴: The proportion of bachelor's degree is 0,125

H1⁴: The proportion of bachelor's degree is not 0,125

H0⁵: The proportion of master's degree is 0,125

H1⁵: The proportion of master's degree is not 0,125

H0⁶: The proportion of Doctorate degree is 0,125

H1⁶: The proportion of Doctorate degree is not 0,125

H0⁷: The proportion of professional degree is 0,125

H1⁷: The proportion of professional degree is not 0,125

H0⁸: The proportion of other is 0,125

H1⁸: The proportion of other is not 0,125

What is your highest (or current) educational level?

	Observed N	Expected N	Residual
High school equivalent	6	20.0	-14.0
Bachelor's degree	43	20.0	23.0
Master's degree	44	20.0	24.0
Professional degree	3	20.0	-17.0
Doctorate's degree	4	20.0	-16.0
Total	100		

Test Statistics

What is your highest (or current) educational level?

Chi-Square	92.300 ^a
df	4
Asymp. Sig.	.000

a. 0 cells (0.0%) have expected frequencies less than 5. The minimum expected cell frequency is 20.0.

P-value = .000 < .05

→ Accept H1¹, H1², H1³, H1⁴, H1⁵, H1⁶, H1⁷ and H1⁸: the highest educational levels are not proportionally represented. Looking at frequencies, the most represented highest educational level are bachelor's degree and master's degree, approximately equivalent, followed to a way smaller extent by high school equivalent, doctorate's degree and professional degree.

App.5.4: Test variable current occupation (nominal) → Chi Square goodness-of-fit



The researcher assumes the population is equally distributed amongst current occupation. Therefore, the proportion of all current occupation category is tested to be 0,2 which represents an exact proportionality.

H0¹: The proportion of employed is 0,2

H1¹: The proportion of employed is not 0,2

H0²: The proportion of student is 0,2

H1²: The proportion of student is not 0,2

H0³: The proportion of retired is 0,2

H1³: The proportion of retired is not 0,2

H0⁴: The proportion of out of work is 0,2

H1⁴: The proportion of out of work is not 0,2

H0⁵: The proportion of other is 0,2

H1⁵: The proportion of other is not 0,2

What is your current occupation?

	Observed N	Expected N	Residual
Employed	37	25.0	12.0
Student	58	25.0	33.0
Out of work	2	25.0	-23.0
Other	3	25.0	-22.0
Total	100		

Test Statistics

What is your current occupation?	
Chi-Square	89.840 ^a
df	3
Asymp. Sig.	.000

a. 0 cells (0.0%) have expected frequencies less than 5. The minimum expected cell frequency is 25.0.

P-value = .000 < .05

→ Accept H1¹, H1², H1³, H1⁴ and H1⁵: the current occupations are not proportionally distributed. Looking at the frequencies, the most represented are students, closely followed by employed and followed to much smaller extent by out of work and others.


App.5.5: Test variable familiar with vertical farming (scale) → one-sample-t-test

The researcher aims at testing the hypothesis that people are neutrally familiar with vertical farming. Therefore, the mean of fake representation of nature is tested to be 3 (neutral).

H0: The mean of familiar with vertical farming is 3

H1: The mean of familiar with vertical farming is not 3

One-Sample Statistics

	N	Mean	Std. Deviation	Std. Error Mean
To what extent do you consider yourself familiar with the concept of vertical farming?	99	3.49	1.082	.109

One-Sample Test

Test Value = 3					
	t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference
					Lower Upper
To what extent do you consider yourself familiar with the concept of vertical farming?	4.551	98	.000	.495	.28 .71

P-value = .000 < .05

→ Accept H1: The mean of familiar with vertical farming is not 3. With 95% certainty the mean is situated between 3,77 (low) and 4,2 (low).

**App.5.6: Test variable fake representation of nature (scale) → One-sample-t-test**

The researcher aims at confirming the literature outcome that ecotourists consider it high that vertical farming is a fake representation of nature. Therefore, the mean of fake representation of nature is tested to be 2 (high).

H0: The mean of the fake representation of nature is 2

H1: The mean of the fake representation of nature is not 2

One-Sample Statistics

	N	Mean	Std. Deviation	Std. Error Mean
To what extent do you think that vertical farming is a fake representation of what happens in a natural environment?	100	2.64	1.030	.103

One-Sample Test

Test Value = 2

	t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
To what extent do you think that vertical farming is a fake representation of what happens in a natural environment?	6.213	99	.000	.640	.44	.84

P-value = .000 < .05

→ Accept H1. The mean of the fake representation of nature is not 2. With 95% certainty, the mean of the fake representation of nature is between 3,08 and 3,48 (Neutral)


App.5.7: Test variable ecologically friendly practice (scale) → One-sample-t-test

The researcher aims at confirming the literature outcome that ecotourists consider it low that vertical farming is an ecologically friendly practice. Therefore, the mean of ecologically friendly practice is tested to be 4 (low).

H0: The mean of ecologically friendly practice is 4

H1: The mean of ecologically friendly practice is not 4

One-Sample Statistics				
	N	Mean	Std. Deviation	Std. Error Mean
To what extent do you think vertical farming is an ecologically friendly practice?	100	3.72	1.026	.103

One-Sample Test					
Test Value = 4					
	t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference
					Lower Upper
To what extent do you think vertical farming is an ecologically friendly practice?	-2.730	99	.008	-.280	-.48 -.08

P-value= .008<.05

→ Accept H1: The mean of ecologically friendly practice is not 4. With 95% certainty, the mean of ecologically friendly practice is between 3,24 (neutral) and 3,64 (low).


App.5.8: Test variable comfortable consuming high-tech produced vegetables (scale)

→ One-sample-t-test

The researcher aims at confirming the literature outcome that ecotourists consider it low that they are comfortable consuming high-tech produced vegetables. Therefore, the mean of comfortable consuming high-tech produced vegetable is tested to be 4 (low).

H0: The mean of comfortable consuming high-tech produced vegetable is 4

H1: The mean of comfortable consuming high-tech produced vegetable is not 4

One-Sample Statistics

	N	Mean	Std. Deviation	Std. Error Mean
To what extent are you comfortable with the idea of consuming high-tech produced vegetables?	99	2.98	1.262	.127

One-Sample Test

Test Value = 4						
	t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
To what extent are you comfortable with the idea of consuming high-tech produced vegetables?	-8.047	98	.000	-1.020	-1.27	-.77

P-value = .000 < .05

→ Accept H1: The mean of comfortable consuming high-tech produced vegetables is not 4. With 95% certainty, the mean of comfortable consuming high-tech produced vegetables is between 1,71 and 2,21 (high)

**App.5.9: Test variable privileged population (scale) → One-sample-t-test**

The researcher aims at confirming the literature outcome that ecotourists consider it high that vertical farming is designed for a privileged population. Therefore, the mean of privileged population is tested to be 2 (high).

H0: The mean of the fake representation of nature is 2

H1: The mean of the fake representation of nature is not 2

One-Sample Statistics

	N	Mean	Std. Deviation	Std. Error Mean
To what extent do you think vertical farming is designed for a privileged population?	100	2.27	.962	.096

One-Sample Test

Test Value = 2						
	t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
To what extent do you think vertical farming is designed for a privileged population?	2.805	99	.006	.270	.08	.46

P-value = .006 < .05

→ Accept H1: The mean of privileged population is not 2. With 95% certainty the mean of privileged population is between 2,32 (high) and 2,73 (neutral).

**App.5.10: Test variable jobs of non-urban farmers (scale) → One-sample-t-test**

The researcher aims at confirming the literature outcome that ecotourists consider it high that vertical farming takes the jobs of non-urban farmers. Therefore, the mean of jobs non-urban farmers is tested to be 2 (high).

H0: The mean of the fake representation of nature is 2

H1: The mean of the fake representation of nature is not 2

One-Sample Statistics

	N	Mean	Std. Deviation	Std. Error Mean
To what extent do you think that the robotized systems used in vertical farming take the jobs of non-urban farmers?	100	2.67	1.240	.124

One-Sample Test

Test Value = 2						
	t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
To what extent do you think that the robotized systems used in vertical farming take the jobs of non-urban farmers?	5.405	99	.000	.670	.42	.92

P-value = .000 < .05.

→ Accept H1: The proportion of jobs of non-urban farmers is not 2. With 95% certainty, the proportion of jobs of non-urban farmers is between 3,09 and 3,59 (neutral to high).



App.5.11: Test variable most applicable statement (nominal) → Chi Square goodness-of-fit

From the literature there are no dominant factor, therefore the mean of each statement is tested to be 0,20 which represents an exact proportionality.

H0¹: The proportion of statement 1 is 0,2

H1¹: The proportion of statement 1 is not 0,2

H0²: The proportion of statement 2 is 0,2

H1²: The proportion of statement 2 is not 0,2

H0³: The proportion of statement 3 is 0,2

H1³: The proportion of statement 3 is not 0,2

H0⁴: The proportion of statement 4 is 0,2

H1⁴: The proportion of statement 4 is not 0,2

H0⁵: The proportion of statement 5 is 0,2

H1⁵: The proportion of statement 5 is not 0,2

When it comes to your scepticism towards vertical farming, which of these statements most applies to yourself?

	Observed N	Expected N	Residual
I think that vertical farming does not represent a natural environment	23	16.7	6.3
I do not think that vertical farming brings ecological added-value	31	16.7	14.3
I feel discomfort consuming high-tech produced vegetables	9	16.7	-7.7
I think vertical farming is designed for a privileged population	22	16.7	5.3
I think that the robotization of vertical farming takes over the jobs of non-urban farmers	12	16.7	-4.7
Other	3	16.7	-13.7
Total	100		

Test Statistics

When it comes to your scepticism towards vertical farming, which of these statements most applies to yourself?

Chi-Square	32.480 ^a
df	5
Asymp. Sig.	.000

a. 0 cells (0.0%) have expected frequencies less than 5. The minimum expected cell frequency is 16.7.

P-value = .000

→ Accept H1¹, H1², H1³, H1⁴ and H1⁵: The statements that most apply are not proportionally distributed. Looking at frequencies, the most represented are ecologically friendly practice, closely followed by fake representation of nature and designed for a privileged population, which seem to be equivalent, followed by discomfort towards consuming high-tech produced vegetables.



App.5.12: Test difference gender (nominal) on factors (scale) → ANOVA

H0¹: There is no difference between the groups male, female and other of the variable gender with regards to the fake representation of nature

H1¹: There is a difference between the groups male, female and other of the variable gender with regards to the fake representation of nature

H0²: There is no difference between the groups male, female and other of the variable gender with regards to ecologically friendly practice

H1²: There is a difference between the groups male, female and other of the variable gender with regards to ecologically friendly practice

H0³: There is no difference between the groups male, female and other of the variable gender with regards to comfortable consuming high-tech produced vegetables

H1³: There is a difference between the groups male, female and other of the variable gender with regards to comfortable consuming high-tech produced vegetables

H0⁴: There is no difference between the groups male, female and other of the variable gender with regards to privileged population

H1⁴: There is a difference between the groups male, female and other of the variable gender with regards to privileged population

H0⁵: There is no difference between the groups male, female and other of the variable gender with regards to jobs non-urban farmers

H1⁵: There is a difference between the groups male, female and other of the variable gender with regards to jobs non-urban farmers

ANOVA						
		Sum of Squares	df	Mean Square	F	Sig.
To what extent do you think that vertical farming is a fake representation of what happens in a natural environment?	Between Groups	2.031	2	1.015	.956	.388
	Within Groups	103.009	97	1.062		
	Total	105.040	99			
To what extent do you think vertical farming is an ecologically friendly practice?	Between Groups	2.679	2	1.340	1.281	.283
	Within Groups	101.481	97	1.046		
	Total	104.160	99			
To what extent are you comfortable with the idea of consuming high-tech produced vegetables?	Between Groups	1.436	2	.718	.446	.641
	Within Groups	154.523	96	1.610		
	Total	155.960	98			
To what extent do you think vertical farming is designed for a privileged population?	Between Groups	3.810	2	1.905	2.102	.128
	Within Groups	87.900	97	.906		
	Total	91.710	99			
To what extent do you think that the robotized systems used in vertical farming take the jobs of non-urban farmers?	Between Groups	1.080	2	.540	.347	.708
	Within Groups	151.030	97	1.557		
	Total	152.110	99			



Descriptives

		N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
						Lower Bound	Upper Bound		
To what extent do you think that vertical farming is a fake representation of what happens in a natural environment?	Male	29	2.48	1.022	.190	2.09	2.87	1	4
	Female	69	2.72	1.042	.125	2.47	2.97	1	5
	Other	2	2.00	.000	.000	2.00	2.00	2	2
	Total	100	2.64	1.030	.103	2.44	2.84	1	5
To what extent do you think vertical farming is an ecologically friendly practice?	Male	29	3.52	1.184	.220	3.07	3.97	1	5
	Female	69	3.78	.953	.115	3.55	4.01	1	5
	Other	2	4.50	.707	.500	-1.85	10.85	4	5
	Total	100	3.72	1.026	.103	3.52	3.92	1	5
To what extent are you comfortable with the idea of consuming high-tech produced vegetables?	Male	29	2.79	1.398	.260	2.26	3.33	1	5
	Female	68	3.06	1.220	.148	2.76	3.35	1	5
	Other	2	3.00	.000	.000	3.00	3.00	3	3
	Total	99	2.98	1.262	.127	2.73	3.23	1	5
To what extent do you think vertical farming is designed for a privileged population?	Male	29	1.97	.823	.153	1.65	2.28	1	4
	Female	69	2.39	.973	.117	2.16	2.63	1	5
	Other	2	2.50	2.121	1.500	-16.56	21.56	1	4
	Total	100	2.27	.962	.096	2.08	2.46	1	5
To what extent do you think that the robotized systems used in vertical farming take the jobs of non-urban farmers?	Male	29	2.62	1.208	.224	2.16	3.08	1	5
	Female	69	2.71	1.273	.153	2.40	3.02	1	5
	Other	2	2.00	.000	.000	2.00	2.00	2	2
	Total	100	2.67	1.240	.124	2.42	2.92	1	5

P-value factor 1 = .388 > .05

→ Accept H_0^1 , there is no difference between the groups male, female and other of the variable gender with regards to the fake representation of nature. The mean is situated at 2.64 (neutral).

P-value factor 2 = .283 > .05

→ Accept H_0^2 , there is no difference between the groups male, female and other of the variable gender with regards to ecologically friendly practice. The mean is situated at 4.50 (low to very low).

P-value factor 3 = .641 > .05.

→ Accept H_0^3 , there is no difference between the groups male, female and other of the variable gender with regards to comfortable consuming high-tech produced vegetables. The mean is situated at 2.98 (neutral).

P-value factor 4 = .128 > .05

→ Accept H_0^4 , there is no difference between the groups male, female and other of the variable gender with regards to privileged population. The mean is situated at 2.27 (high).

P-value factor 5 = .708 > .05

→ Accept H_0^5 , there is no difference between the groups male, female and other of the variable gender with regards to jobs non-urban farmers. The mean is situated at 2.67 (neutral).


App.5.13: Test difference age (ordinal) on factors (scale) → Kruskal Wallis Test

H0¹: There is no difference between the groups <18, 18-25, 26-35, 36-45, 46-55, 56-65, 65+ of the variable age with regards to the fake representation of nature

H1¹: There is a difference between the groups <18, 18-25, 26-35, 36-45, 46-55, 56-65, 65+ of the variable age with regards to the fake representation of nature

H0²: There is no difference between the groups <18, 18-25, 26-35, 36-45, 46-55, 56-65, 65+ of the variable age with regards to ecologically friendly practice

H1²: There is a difference between the groups <18, 18-25, 26-35, 36-45, 46-55, 56-65, 65+ of the variable age with regards to ecologically friendly practice

H0³: There is no difference between the groups <18, 18-25, 26-35, 36-45, 46-55, 56-65, 65+ of the variable age with regards to comfortable consuming high-tech produced vegetables

H1³: There is a difference between the groups <18, 18-25, 26-35, 36-45, 46-55, 56-65, 65+ of the variable age with regards to comfortable consuming high-tech produced vegetables

H0⁴: There is no difference between the groups <18, 18-25, 26-35, 36-45, 46-55, 56-65, 65+ of the variable age with regards to privileged population

H1⁴: There is a difference between the groups <18, 18-25, 26-35, 36-45, 46-55, 56-65, 65+ of the variable age with regards to privileged population

H0⁵: There is no difference between the groups <18, 18-25, 26-35, 36-45, 46-55, 56-65, 65+ of the variable age with regards to jobs non-urban farmers

H1⁵: There is a difference between the groups <18, 18-25, 26-35, 36-45, 46-55, 56-65, 65+ of the variable age with regards to jobs non-urban farmers

Descriptive Statistics

	N	Mean	Std. Deviation	Minimum	Maximum
To what extent do you think that vertical farming is a fake representation of what happens in a natural environment?	100	2.64	1.030	1	5
To what extent do you think vertical farming is an ecologically friendly practice?	100	3.72	1.026	1	5
To what extent are you comfortable with the idea of consuming high-tech produced vegetables?	99	2.98	1.262	1	5
To what extent do you think vertical farming is designed for a privileged population?	100	2.27	.962	1	5
To what extent do you think that the robotized systems used in vertical farming take the jobs of non-urban farmers?	100	2.67	1.240	1	5
What is your age?	100	2.46	.926	2	6



Kruskal-Wallis Test

Ranks			
What is your age?	N	Mean Rank	
To what extent do you think that vertical farming is a fake representation of what happens in a natural environment?	18-25	73	50.18
	26-35	17	37.88
	36-45	3	77.33
	46-55	5	62.40
	Total	98	
To what extent do you think vertical farming is an ecologically friendly practice?	18-25	73	49.74
	26-35	17	50.59
	36-45	3	45.17
	46-55	5	44.90
	Total	98	
To what extent do you think vertical farming is a fake representation of what happens in a natural environment?	18-25	72	48.42
	26-35	17	55.12
	36-45	3	42.33
	46-55	5	40.60
	Total	97	
To what extent do you think vertical farming is designed for a privileged population?	18-25	73	47.65
	26-35	17	53.47
	36-45	3	43.00
	46-55	5	66.90
	Total	98	
To what extent do you think that the robotized systems used in vertical farming take the jobs of non-urban farmers?	18-25	73	46.89
	26-35	17	47.88
	36-45	3	78.17
	46-55	5	75.90
	Total	98	

Test Statistics^{a,b}

	To what extent do you think that vertical farming is a fake representation of what happens in a natural environment?	To what extent do you think vertical farming is an ecologically friendly practice?	To what extent are you comfortable with the idea of consuming high-tech produced vegetables?	To what extent do you think vertical farming is designed for a privileged population?	To what extent do you think that the robotized systems used in vertical farming take the jobs of non-urban farmers?
Kruskal-Wallis H	7.343	.254	1.533	3.008	8.511
df	3	3	3	3	3
Asymp. Sig.	.062	.968	.675	.390	.037

a. Kruskal Wallis Test

b. Grouping Variable: What is your age?

P-value factor 1 = .062 > .05

→ Accept H₀¹: there is no difference between the groups <18, 18-25, 26-35, 36-45, 46-55, 56-65, 65+ of the variable age with regards to the fake representation of nature. The mean is situated at 2.64 (neutral).

P-value factor 2 = .968 > .05

→ Accept H₀²: there is no difference between the groups <18, 18-25, 26-35, 36-45, 46-55, 56-65, 65+ of the variable age with regards to ecologically friendly practice. The mean is situated at 3.72 (low).

P-value factor 3 = .675 > .05

→ Accept H₀³: there is no difference between the groups <18, 18-25, 26-35, 36-45, 46-55, 56-65, 65+ of the variable age with regards to comfortable consuming high-tech produced vegetables. The mean is situated at 2.98 (neutral).

P-value factor 4 = .390 > .05

→ Accept H₀⁴: there is no difference between the groups <18, 18-25, 26-35, 36-45, 46-55, 56-65, 65+ of the variable age with regards to privileged population. The mean is situated at 2.27 (high).

P-value factor 5 = .037 < .05

→ Accept H₁⁵: there is a difference between the groups <18, 18-25, 26-35, 36-45, 46-55, 56-65, 65+ of the variable age with regards to jobs non-urban farmers.

The people aged in the category 36-55 years old tend to rank the factor higher. Which means that the older the ecotourist is the more he will think that the robotized systems used in vertical farming take the jobs of non-urban farmers.



App.5.14: Test difference highest educational level (nominal) on factors (scale) → ANOVA

H0¹: There is no difference between the groups none, middle school equivalent, high school equivalent, bachelor's degree, master's degree, doctorate degree, professional degree and other of the variable highest educational level with regards to the fake representation of nature

H1¹: There is a difference between the groups none, middle school equivalent, high school equivalent, bachelor's degree, master's degree, doctorate degree, professional degree and other of the variable highest educational level with regards to the fake representation of nature

H0²: There is no difference between the groups none, middle school equivalent, high school equivalent, bachelor's degree, master's degree, doctorate degree, professional degree and other of the variable highest educational level with regards to ecologically friendly practice

H1²: There is a difference between the groups none, middle school equivalent, high school equivalent, bachelor's degree, master's degree, doctorate degree, professional degree and other of the variable highest educational level with regards to ecologically friendly practice

H0³: There is no difference between the groups none, middle school equivalent, high school equivalent, bachelor's degree, master's degree, doctorate degree, professional degree and other of the variable highest educational level with regards to comfortable consuming high-tech produced vegetables

H1³: There is a difference between the groups none, middle school equivalent, high school equivalent, bachelor's degree, master's degree, doctorate degree, professional degree and other of the variable highest educational level with regards to comfortable consuming high-tech produced vegetables

H0⁴: There is no difference between the groups none, middle school equivalent, high school equivalent, bachelor's degree, master's degree, doctorate degree, professional degree and other of the variable highest educational level with regards to privileged population

H1⁴: There is a difference between the groups none, middle school equivalent, high school equivalent, bachelor's degree, master's degree, doctorate degree, professional degree and other of the variable highest educational level with regards to privileged population

H0⁵: There is no difference between the groups none, middle school equivalent, high school equivalent, bachelor's degree, master's degree, doctorate degree, professional degree and other of the variable highest educational level with regards to jobs non-urban farmers

H1⁵: There is a difference between the groups none, middle school equivalent, high school equivalent, bachelor's degree, master's degree, doctorate degree, professional degree and other of the variable highest educational level with regards to jobs non-urban farmers



		Sum of Squares	df	Mean Square	F	Sig.
To what extent do you think that vertical farming is a fake representation of what happens in a natural environment?	Between Groups	3.975	4	.994	.934	.448
	Within Groups	101.065	95	1.064		
	Total	105.040	99			
To what extent do you think vertical farming is an ecologically friendly practice?	Between Groups	3.066	4	.767	.720	.580
	Within Groups	101.094	95	1.064		
	Total	104.160	99			
To what extent are you comfortable with the idea of consuming high-tech produced vegetables?	Between Groups	4.022	4	1.005	.622	.648
	Within Groups	151.938	94	1.616		
	Total	155.960	98			
To what extent do you think vertical farming is designed for a privileged population?	Between Groups	8.866	4	2.217	2.542	.045
	Within Groups	82.844	95	.872		
	Total	91.710	99			
To what extent do you think that the robotized systems used in vertical farming take the jobs of non-urban farmers?	Between Groups	10.319	4	2.580	1.728	.150
	Within Groups	141.791	95	1.493		
	Total	152.110	99			

Descriptives

		N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
To what extent do you think that vertical farming is a fake representation of what happens in a natural environment?	High school equivalent	6	2.33	.816	.333	1.48	3.19	1	3
	Bachelor's degree	43	2.74	1.093	.167	2.41	3.08	1	5
	Master's degree	44	2.57	.974	.147	2.27	2.86	1	4
	Professional degree	3	2.00	1.000	.577	-.48	4.48	1	3
	Doctorate's degree	4	3.25	1.258	.629	1.25	5.25	2	5
	Total	100	2.64	1.030	.103	2.44	2.84	1	5
To what extent do you think vertical farming is an ecologically friendly practice?	High school equivalent	6	3.50	1.225	.500	2.21	4.79	2	5
	Bachelor's degree	43	3.79	.914	.139	3.51	4.07	2	5
	Master's degree	44	3.77	1.031	.155	3.46	4.09	1	5
	Professional degree	3	3.00	1.732	1.000	-1.30	7.30	2	5
	Doctorate's degree	4	3.25	1.500	.750	.86	5.64	1	4
	Total	100	3.72	1.026	.103	3.52	3.92	1	5
To what extent are you comfortable with the idea of consuming high-tech produced vegetables?	High school equivalent	6	2.67	1.366	.558	1.23	4.10	1	5
	Bachelor's degree	43	2.91	1.360	.207	2.49	3.33	1	5
	Master's degree	43	3.02	1.165	.178	2.66	3.38	1	5
	Professional degree	3	4.00	1.000	.577	1.52	6.48	3	5
	Doctorate's degree	4	3.00	1.414	.707	.75	5.25	1	4
	Total	99	2.98	1.262	.127	2.73	3.23	1	5
To what extent do you think vertical farming is designed for a privileged population?	High school equivalent	6	2.00	.632	.258	1.34	2.66	1	3
	Bachelor's degree	43	2.07	1.009	.154	1.76	2.38	1	5
	Master's degree	44	2.59	.923	.139	2.31	2.87	1	5
	Professional degree	3	1.67	.577	.333	.23	3.10	1	2
	Doctorate's degree	4	1.75	.500	.250	.95	2.55	1	2
	Total	100	2.27	.962	.096	2.08	2.46	1	5
To what extent do you think that the robotized systems used in vertical farming take the jobs of non-urban farmers?	High school equivalent	6	2.00	1.265	.516	.67	3.33	1	4
	Bachelor's degree	43	2.42	1.118	.170	2.07	2.76	1	5
	Master's degree	44	2.95	1.293	.195	2.56	3.35	1	5
	Professional degree	3	2.67	1.155	.667	-.20	5.54	2	4
	Doctorate's degree	4	3.25	1.500	.750	.86	5.64	2	5
	Total	100	2.67	1.240	.124	2.42	2.92	1	5

P-value factor 1 = .448 > .05

→ Accept H₀¹: there is no difference between the groups none, middle school equivalent, high school equivalent, bachelor's degree, master's degree, doctorate degree, professional degree and other of the variable highest educational level with regards to the fake representation of nature. The mean is situated at 2.64 (neutral).



P-value factor 2 = .580 > .05

→ Accept H₀²: there is no difference between the groups none, middle school equivalent, high school equivalent, bachelor's degree, master's degree, doctorate degree, professional degree and other of the variable highest educational level with regards to ecologically friendly practice. The mean is situated at 3.72 (low)

P-value factor 3 = .648 > .05

→ Accept H₀³: there is no difference between the groups none, middle school equivalent, high school equivalent, bachelor's degree, master's degree, doctorate degree, professional degree and other of the variable highest educational level with regards to comfortable consuming high-tech produced vegetables. The mean is situated at 2.98 (neutral).

P-value factor 4 = .045 < .05

→ Accept H₁⁴: there is a difference between the groups none, middle school equivalent, high school equivalent, bachelor's degree, master's degree, doctorate degree, professional degree and other of the variable highest educational level with regards to privileged population.

Bonferroni

Dependent Variable	(I) What is your highest (or current) educational level?	(J) What is your highest (or current) educational level?	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
To what extent do you think vertical farming is designed for a privileged population?	High school equivalent	Bachelor's degree	-.070	.407	1.000	-1.24	1.10
		Master's degree	-.591	.406	1.000	-1.76	.58
		Professional degree	.333	.660	1.000	-1.56	2.23
		Doctorate's degree	.250	.603	1.000	-1.48	1.98
	Bachelor's degree	High school equivalent	.070	.407	1.000	-1.10	1.24
		Master's degree	-.521	.200	.107	-1.10	.05
		Professional degree	.403	.558	1.000	-1.20	2.01
		Doctorate's degree	.320	.488	1.000	-1.08	1.72
	Master's degree	High school equivalent	.591	.406	1.000	-.58	1.76
		Bachelor's degree	.521	.200	.107	-.05	1.10
		Professional degree	.924	.557	1.000	-.68	2.53
		Doctorate's degree	.841	.488	.879	-.56	2.24
	Professional degree	High school equivalent	-.333	.660	1.000	-2.23	1.56
		Bachelor's degree	-.403	.558	1.000	-2.01	1.20
		Master's degree	-.924	.557	1.000	-2.53	.68
		Doctorate's degree	-.083	.713	1.000	-2.13	1.97
	Doctorate's degree	High school equivalent	-.250	.603	1.000	-1.98	1.48
		Bachelor's degree	-.320	.488	1.000	-1.72	1.08
		Master's degree	-.841	.488	.879	-2.24	.56
		Professional degree	.083	.713	1.000	-1.97	2.13

From the Bonferroni test, the mean of bachelor's degree is situated at 2.07 (high), alongst with high school equivalent, professional degree and doctorate degree. However, the mean of master's degree is situated at 2.59 (neutral).

P-value factor 5 = .150 > .05

→ Accept H₀⁵: There is no difference between the groups none, middle school equivalent, high school equivalent, bachelor's degree, master's degree, doctorate degree, professional degree and other of the variable highest educational level with regards to jobs non-urban farmers. The mean is situated at 2.67 (neutral).


App.5.15: Test difference current occupation (nominal) on factors (scale) → ANOVA

H0¹: There is no difference between the groups employed, student, out of work, retired and other of the variable current occupation with regards to the fake representation of nature

H1¹: There is a difference between the groups employed, student, out of work, retired and other of the variable current occupation with regards to the fake representation of nature

H0²: There is no difference between the groups employed, student, out of work, retired and other of the variable current occupation with regards to ecologically friendly practice

H1²: There is a difference between the groups employed, student, out of work, retired and other of the variable current occupation with regards to ecologically friendly practice

H0³: There is no difference between the groups employed, student, out of work, retired and other of the variable current occupation with regards to comfortable consuming high-tech produced vegetables

H1³: There is a difference between the groups employed, student, out of work, retired and other of the variable current occupation with regards to comfortable consuming high-tech produced vegetables

H0⁴: There is no difference between the groups employed, student, out of work, retired and other of the variable current occupation with regards to privileged population

H1⁴: There is a difference between the groups employed, student, out of work, retired and other of the variable current occupation with regards to privileged population

H0⁵: There is no difference between the groups employed, student, out of work, retired and other of the variable current occupation with regards to jobs non-urban farmers

H1⁵: There is a difference between the groups employed, student, out of work, retired and other of the variable current occupation with regards to jobs non-urban farmers

ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
To what extent do you think that vertical farming is a fake representation of what happens in a natural environment?	Between Groups	5.113	3	1.704	1.637	.186
	Within Groups	99.927	96	1.041		
	Total	105.040	99			
To what extent do you think vertical farming is an ecologically friendly practice?	Between Groups	1.044	3	.348	.324	.808
	Within Groups	103.116	96	1.074		
	Total	104.160	99			
To what extent are you comfortable with the idea of consuming high-tech produced vegetables?	Between Groups	3.916	3	1.305	.816	.488
	Within Groups	152.044	95	1.600		
	Total	155.960	98			
To what extent do you think vertical farming is designed for a privileged population?	Between Groups	1.377	3	.459	.488	.691
	Within Groups	90.333	96	.941		
	Total	91.710	99			
To what extent do you think that the robotized systems used in vertical farming take the jobs of non-urban farmers?	Between Groups	6.454	3	2.151	1.418	.242
	Within Groups	145.656	96	1.517		
	Total	152.110	99			



Descriptives									
		N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
To what extent do you think that vertical farming is a fake representation of what happens in a natural environment?	Employed	37	2.49	1.121	.184	2.11	2.86	1	5
	Student	58	2.71	.973	.128	2.45	2.96	1	4
	Out of work	2	2.00	.000	.000	2.00	2.00	2	2
	Other	3	3.67	.577	.333	2.23	5.10	3	4
	Total	100	2.64	1.030	.103	2.44	2.84	1	5
To what extent do you think vertical farming is an ecologically friendly practice?	Employed	37	3.65	1.184	.195	3.25	4.04	1	5
	Student	58	3.79	.951	.125	3.54	4.04	1	5
	Out of work	2	3.50	.707	.500	-2.85	9.85	3	4
	Other	3	3.33	.577	.333	1.90	4.77	3	4
	Total	100	3.72	1.026	.103	3.52	3.92	1	5
To what extent are you comfortable with the idea of consuming high-tech produced vegetables?	Employed	37	3.14	1.316	.216	2.70	3.57	1	5
	Student	57	2.93	1.237	.164	2.60	3.26	1	5
	Out of work	2	3.00	1.414	1.000	-9.71	15.71	2	4
	Other	3	2.00	1.000	.577	-.48	4.48	1	3
	Total	99	2.98	1.262	.127	2.73	3.23	1	5
To what extent do you think vertical farming is designed for a privileged population?	Employed	37	2.41	1.092	.180	2.04	2.77	1	5
	Student	58	2.19	.847	.111	1.97	2.41	1	4
	Out of work	2	2.50	2.121	1.500	-16.56	21.56	1	4
	Other	3	2.00	1.000	.577	-.48	4.48	1	3
	Total	100	2.27	.962	.096	2.08	2.46	1	5
To what extent do you think that the robotized systems used in vertical farming take the jobs of non-urban farmers?	Employed	37	2.76	1.211	.199	2.35	3.16	1	5
	Student	58	2.55	1.259	.165	2.22	2.88	1	5
	Out of work	2	2.50	.707	.500	-3.85	8.85	2	3
	Other	3	4.00	1.000	.577	1.52	6.48	3	5
	Total	100	2.67	1.240	.124	2.42	2.92	1	5

P-value factor 1 = .186 > .05

→ Accept H₀¹: there is no difference between the groups employed, student, out of work, retired and other of the variable current occupation with regards to the fake representation of nature. The mean is situated at 2,64 (neutral).

P-value factor 2 = .808 > .05

→ Accept H₀²: there is no difference between the groups employed, student, out of work, retired and other of the variable current occupation with regards to ecologically friendly practice. The mean is situated at 3,72 (low).

P-value factor 3 = .488 > .05

→ Accept H₀³: there is no difference between the groups employed, student, out of work, retired and other of the variable current occupation with regards to comfortable consuming high-tech produced vegetables. The mean is situated at 2,98 (neutral).

P-value factor 4 = .691 > .05

→ Accept H₀⁴: there is no difference between the groups employed, student, out of work, retired and other of the variable current occupation with regards to privileged population. The mean is situated at 2,27 (high).

P-value factor 5 = .242 > .05

→ Accept H₀⁵: there is no difference between the groups employed, student, out of work, retired and other of the variable current occupation with regards to jobs non-urban farmers. The mean is situated at 2,67 (neutral).



App.5.16: Test correlation familiar with vertical farming (scale) on factors (scale) → Pearson's R

H0¹: There is no relation between variable familiar with vertical farming and the fake representation of nature

H1¹: There is a relation between familiar with vertical farming and the fake representation of nature

		To what extent do you consider yourself familiar with the concept of vertical farming?	To what extent do you think that vertical farming is a fake representation of what happens in a natural environment?
To what extent do you consider yourself familiar with the concept of vertical farming?	Pearson Correlation	1	-.230 [*]
	Sig. (2-tailed)		.022
	N	99	99
To what extent do you think that vertical farming is a fake representation of what happens in a natural environment?	Pearson Correlation	-.230 [*]	1
	Sig. (2-tailed)	.022	
	N	99	100

P-value = .022 < .05

→ Accept H1¹, there is a relation between familiar with vertical farming and the fake representation of nature. The correlation coefficient is -0,230, which means the correlation is negative and weak; with many exceptions, the more someone considers himself familiar with vertical farming, the less he thinks that vertical farming is a fake representation of nature.

H0²: There is no relation familiar with vertical farming and ecologically friendly practice

H1²: There is a relation between familiar with vertical farming and ecologically friendly practice

		To what extent do you consider yourself familiar with the concept of vertical farming?	To what extent do you think vertical farming is an ecologically friendly practice?
To what extent do you consider yourself familiar with the concept of vertical farming?	Pearson Correlation	1	.127
	Sig. (2-tailed)		.211
	N	99	99
To what extent do you think vertical farming is an ecologically friendly practice?	Pearson Correlation	.127	1
	Sig. (2-tailed)	.211	
	N	99	100

P-value = .211 > .05

→ Accept H0², there is no relation familiar with vertical farming and ecologically friendly practice

H0³: There is no relation between familiar with vertical farming and comfortable consuming high-tech produced vegetables

H1³: There is a relation familiar with vertical farming and comfortable consuming high-tech produced vegetables



		To what extent do you consider yourself familiar with the concept of vertical farming?	To what extent are you comfortable with the idea of consuming high-tech produced vegetables?
To what extent do you consider yourself familiar with the concept of vertical farming?	Pearson Correlation	1	.163
	Sig. (2-tailed)		.109
	N	99	98
To what extent are you comfortable with the idea of consuming high-tech produced vegetables?	Pearson Correlation	.163	1
	Sig. (2-tailed)	.109	
	N	98	99

P-value = .109 > .05

→ Accept H_0^3 , there is no relation between familiar with vertical farming and comfortable consuming high-tech produced vegetables

H_0^4 : There is no relation between familiar with vertical farming and privileged population

H_1^4 : There is a relation between familiar with vertical farming and privileged population

		To what extent do you consider yourself familiar with the concept of vertical farming?	To what extent do you think vertical farming is designed for a privileged population?
To what extent do you consider yourself familiar with the concept of vertical farming?	Pearson Correlation	1	.011
	Sig. (2-tailed)		.913
	N	99	99
To what extent do you think vertical farming is designed for a privileged population?	Pearson Correlation	.011	1
	Sig. (2-tailed)	.913	
	N	99	100

P-value = .913 > .05

→ Accept H_0^4 , there is no relation between familiar with vertical farming and privileged population

H_0^5 : There is no relation between familiar with vertical farming and jobs non-urban farmers

H_1^5 : There is a relation between familiar with vertical farming and jobs non-urban farmers

		To what extent do you consider yourself familiar with the concept of vertical farming?	To what extent do you think that the robotized systems used in vertical farming take the jobs of non-urban farmers?
To what extent do you consider yourself familiar with the concept of vertical farming?	Pearson Correlation	1	-.070
	Sig. (2-tailed)		.492
	N	99	99
To what extent do you think that the robotized systems used in vertical farming take the jobs of non-urban farmers?	Pearson Correlation	-.070	1
	Sig. (2-tailed)	.492	
	N	99	100

P-value = .492 > .05

→ Accept H_0^5 , there is no relation between familiar with vertical farming and jobs non-urban farmers


App.5.17: Test correlation gender (nominal) on statement that most applies (nominal)

→ Fisher's exact test (due to invalid Chi square test >20% of cells with expected count lower than 5)

H0: There is no relation between gender and the statement that most applies

H1: There is a relation between gender and the statement that most applies

What is your gender? * When it comes to your scepticism towards vertical farming, which of these statements most applies to yourself? Crosstabulation

Count

		When it comes to your scepticism towards vertical farming, which of these statements most applies to yourself?						
		I think that vertical farming does not represent a natural environment	I do not think that vertical farming brings ecological added-value	I feel discomfort consuming high-tech produced vegetables	I think vertical farming is designed for a privileged population	I think that the robotization of vertical farming takes over the jobs of non-urban farmers	Other	Total
What is your gender?	Male	7	7	1	8	5	1	29
	Female	15	23	8	14	7	2	69
	Other	1	1	0	0	0	0	2
Total		23	31	9	22	12	3	100

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)	Point Probability
Pearson Chi-Square	5.308 ^a	10	.870	.870		
Likelihood Ratio	6.331	10	.795	.853		
Fisher-Freeman-Halton Exact Test	7.174			.810		
Linear-by-Linear Association	1.551 ^b	1	.213	.238	.121	.026
N of Valid Cases	100					

a. 10 cells (55.6%) have expected count less than 5. The minimum expected count is .06.

b. The standardized statistic is -1.245.

P-value = .810 > .05

→ Accept H0: There is no relation between gender and the statement that most applies.



App.5.18: Test difference age (ordinal) on statement that most applies (nominal) →
Discriminant analysis

H0: There is no difference between the groups <18, 18-25, 26-35, 36-45, 46-55, 56-65, 65+ of the variable age with regards to the statement that most applies

H1: There is a difference between the groups <18, 18-25, 26-35, 36-45, 46-55, 56-65, 65+ of the variable age with regards to the statement that most applies

Eigenvalues

Function	Eigenvalue	% of Variance	Cumulative %	Canonical Correlation
1	.054 ^a	100.0	100.0	.226

a. First 1 canonical discriminant functions were used in the analysis.

Wilks' Lambda

Test of Function(s)	Wilks' Lambda	Chi-square	df	Sig.
1	.949	4.972	3	.174

P-value = .174 > .05

→ Accept H0: there is no difference between the groups <18, 18-25, 26-35, 36-45, 46-55, 56-65, 65+ of the variable age with regards to the statement that most applies.



App.5.19: Test correlation highest educational level (nominal) on statement that most applies (nominal) → Fisher's exact test (due to invalid Chi square test >20% of cells with expected count lower than 5)

H0: There is no relation between highest educational level and the statement that most applies

H1: There is a relation between highest educational level and the statement that most applies

When it comes to your scepticism towards vertical farming, which of these statements most applies to yourself?

		I think that vertical farming does not represent a natural environment	I do not think that vertical farming brings ecological added-value	I feel discomfort consuming high-tech produced vegetables	I think vertical farming is designed for a privileged population	I think that the robotization of vertical farming takes over the jobs of non-urban farmers	Other	Total
What is your highest (or current) educational level?	High school equivalent	0	1	2	2	1	0	6
	Bachelor's degree	9	13	4	8	7	2	43
	Master's degree	13	16	1	9	4	1	44
	Professional degree	0	1	1	1	0	0	3
	Doctorate's degree	1	0	1	2	0	0	4
Total		23	31	9	22	12	3	100

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)	Point Probability
Pearson Chi-Square	19.310 ^a	20	.502	. ^b		
Likelihood Ratio	21.439	20	.372	.448		
Fisher-Freeman-Halton Exact Test	20.372			.292		
Linear-by-Linear Association	1.110 ^c	1	.292	.302	.157	.019
N of Valid Cases	100					

a. 22 cells (73.3%) have expected count less than 5. The minimum expected count is .09.

b. Cannot be computed because there is insufficient memory.

c. The standardized statistic is -1.054.

P-value = .292 > .05

→ Accept H0: There is no relation between highest educational level and the statement that most applies.



App.5.20: Test correlation current occupation (nominal) on statement that most applies (nominal) → Fisher's exact test (due to invalid Chi square test >20% of cells with expected count lower than 5)

H0: There is no relation between current occupation and the statement that most applies

H1: There is a relation between current occupation and the statement that most applies

Count

		When it comes to your scepticism towards vertical farming, which of these statements most applies to yourself?						
		I think that vertical farming does not represent a natural environment	I do not think that vertical farming brings ecological added-value	I feel discomfort consuming high-tech produced vegetables	I think vertical farming is designed for a privileged population	I think that the robotization of vertical farming takes over the jobs of non-urban farmers	Other	Total
What is your current occupation?	Employed	10	11	4	6	4	2	37
	Student	11	19	5	15	8	0	58
	Out of work	2	0	0	0	0	0	2
	Other	0	1	0	1	0	1	3
Total		23	31	9	22	12	3	100

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)	Point Probability
Pearson Chi-Square	21.898 ^a	15	.111	.141		
Likelihood Ratio	17.807	15	.273	.221		
Fisher-Freeman-Halton Exact Test	16.269			.277		
Linear-by-Linear Association	.314 ^b	1	.575	.594	.301	.028
N of Valid Cases	100					

a. 16 cells (66.7%) have expected count less than 5. The minimum expected count is .06.

b. The standardized statistic is .560.

P-value = .277 > .05

→ Accept H0: there is no relation between current occupation and the statement that most applies.



App.5.21: Test correlation familiar with vertical farming (scale) on statement that most applies (nominal) → Fisher's exact test (due to invalid Chi square test >20% of cells with expected count lower than 5)

H0: There is no relation between familiar with vertical farming and the statement that most applies

H1: There is a relation between familiar with vertical farming and the statement that most applies

To what extent do you consider yourself familiar with the concept of vertical farming? * When it comes to your scepticism towards vertical farming, which of these statements most applies to yourself? Crosstabulation

Count

		When it comes to your scepticism towards vertical farming, which of these statements most applies to yourself?						
		I think that vertical farming does not represent a natural environment	I do not think that vertical farming brings ecological added-value	I feel discomfort consuming high-tech produced vegetables	I think vertical farming is designed for a privileged population	I think that the robotization of vertical farming takes over the jobs of non-urban farmers	Other	Total
To what extent do you consider yourself familiar with the concept of vertical farming?	High	2	8	2	8	3	1	24
	Neutral	5	10	2	4	2	0	23
	Low	9	7	3	8	4	0	31
	Very low	7	6	2	2	3	1	21
Total		23	31	9	22	12	2	99

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	11.665 ^a	15	.704	^b	
Likelihood Ratio	13.258	15	.582	.701	
Fisher-Freeman-Halton Exact Test	12.343			.638	
Linear-by-Linear Association	1.607	1	.205	^b	^b
N of Valid Cases	99				

a. 14 cells (58.3%) have expected count less than 5. The minimum expected count is .42.

b. Cannot be computed because there is insufficient memory.

P-value = .638 > .05

→ Accept H0: there is no relation between familiar with vertical farming and the statement that most applies.



App.6: Transcript focus group

Tanguy (T): So, I had a few ideas on how we could do a learning module. Mrs Gikas, my coach for the thesis advised me to take a look at some models and see exactly what was important. And a lot of models nowadays, they're focusing on **participative learning**. It's kind of like, you know, what we got in MCH. And BMI, especially during phase three, it's like this progressive learning where the student is kind of in charge of his learning. Do you think there are ways that students can better educate themselves about vertical farming? First more of in the preparation phase before the learning module? What do you think would be interesting aspects? to approach this? My basic idea was maybe to **send them some articles and resources** about it. Do you perhaps have any ideas on how can we prepare for a new learning module?

Mrs. de Jong (M): I'm sorry, one question before: what is the target market? So you're talking about students? But in what context?

T: Yes, so **the target market for my thesis was ecotourists**. And when I did my research, and I found out about my demographics, I saw that a lot of my participants and it was confirmed to the statistical testing, were mostly **master's students and bachelor students aged 18 to 25**. That was the dominant group. So that would be my target market for now.

M: And would it then be something they learn and university? Or would it be something they search for themselves because they're interested in topics?

T: I think it could be incorporated within courses for hotel school. I was thinking in the **course the future of foods they have this whole part about feeding the world and the world of the future**. I think it would make a lot of sense to maybe incorporate some elements into it as it is. Feeding the world is a problem completely linked to vertical farming. So could have been a great way to place it there.

M: Yeah. Okay.

Francesco (F): Is it just from a theoretical or practical point of view, like actually just sending them materials? Or is it something that, for example, you forecast to go and **visit a farm or do a little farm experiment**?

T: So yeah, that was also something I was considering. The way I was thinking about it was to do a **pre module type of preparation**. So, in the sense of **progressive learning where they can first build up a list of questions about it, then we could have the actual learning module, where we will do something that I want to talk to you about**. I thought about **visiting some farms, why not introduce a farming concept in hotel school, The Hague** as we have the resources, and also the mindset, I think people are quite open to the idea nowadays. Or other things, maybe something a little bit more low key, then, because visiting a farm or building one are quite some ambitious projects. So definitely something we can touch upon. But let's keep this for later.

M: Maybe back to your question, probably because now I understand better the context.

T: Yes. So back to the question. In the preparation phase, I will go before a learning module. What do you think is best like sending them resources and they can build a list of questions or...

Gemma (G): question about this sorry, like also still preparing kind of the answer? So, preparation phase for the institution that would teach the model or preparation phase for the students are ready who are the final recipients of this?

T: It would be for the recipients? Yep. Okay. Yep.



G: I think it's always really important to... Yeah, maybe sounds overly simplistic, but to keep it interesting, so do not, I would not send a bunch of articles or like really just diverse information but concise. Like you know, like a one-pager where like, the whole concept of vertical farming is introduced, maybe like starting with: Okay, where did it start? You know, what is the idea what is like the why behind it? What is the potential to, you know, because I think the topic is super interesting, but if I would receive an email with five documents in it and like, yeah, all kinds of different information? I'm not sure I would go through all of that, even though I do care about it. So, yeah, they weren't to, you know, think like, the people who receive it. Okay.

T: No, that completely makes sense. And then Gemma in this kind of thing, do you think that video would be something more appealing to a student, for example?

G: could be, I think that same thing would apply just like for written texts and one-pager. I think they're to keep it under 10 minutes, I think what makes sense because when it goes beyond that, it quickly becomes not okay. You need to find time to sit down and do it. But also, obviously, there, if it's kind of an obligation that you have because it's part of your course, you know, people have I think, are more willing, or, you know, there's more motivation. So it's, I think you also need to consider whether it's completely voluntary, you know, in that sense, or whether there's also like some other motivators there.

T: Okay. Yeah. Francesco?

F: Yeah, kind of like an infographic that would introduce the topic, I still think is important to just like, plant the seed, and send an email, but do not expect that if you send some documents people are going to read it. I think is mostly just to introduce them to tell them like this is what is going to happen. Because I think that there will be a big filter between the people that would read it in the sense, probably, honestly, 90% would read it would be "cool", and close the email. But then you have a 10%, which I think is probably more about your target market, which is something that would be interesting, what I think could be interesting, maybe it's not just doing it from school, but include some other parties to send the emails or something. I'm thinking for example, in HTH, the investment club, because I think since vertical farming is also something in the future, something that maybe you have also a lot of people that could be interested in investing. And that's why including also that type of market is, is a nice touch.

T: Okay, so you would like to maybe have a cooperation with some sort of a vertical farm outside that directly prepares a well concise document aimed at students?

F: Already, then I think they will go a bit later. Like, because the thing as well as I think first, you also have to check if there is this willingness to this day, like you should kind of first see and check. Okay, the students of HTH, actually really interested. I don't know if you've already confirmed that or not. Because if you then start and go with this project, but then you see that there is a lot of likes, the ad reaction from the students... I think it could be a bit meh...

T: I think the plan of the solution was to kind of introduce the pilot, or it would be a test. And if it were to be successful, and we would get a nice reaction from the students, it would be nice, and I'd like to go further with the idea and then build up into projects into vertical farming and make it a part of hotel school. Eventually, you know, but I was more seeing this solution as a bit of a pilot test. Exactly. So, I didn't test it yet. But it would be the test. Somehow.

F: What comes to mind when I think about this is, for example, a lot of people will be like oh really cool, but maybe they can also say: depends on if you propose it if it's to solve world hunger. People might tell you "Okay, very clever. Very cool, but why vertical farm? Why not something else?"

T: Yes, Mrs. de Jong?

M: Yes, I think there are lots of ideas I have in my head. So, what I was thinking is that, of



course: how to engage students and what kind of learning could you apply to it? In my experience, most education we're sort of still too much sort of putting a job, so this is it, just read it and do an assignment. And so, I would prefer if you would come up with something to flip that. Okay well we're all interested in vertical farming or that that's the goal of this of use. That groups of students are going to look into specific topics or known topics so okay you're going to dive into this topic and now please present back in the first time we meet and then you have all the specialists that are going to share information acknowledged. It's called the Jigsaw method. And then you can learn from each other. If you want, I can send you the link if you like but there's a difference here are you can use that differently and the learning should be the responsibility of the students instead of the teachers. Because what are teachers going to say? "Okay, this is what vertical farming is about. And okay, I just read it because that's it". I don't think that's the most inspiring. But of course, it is possible to develop a database with lots of articles that are being collected by the students. So, I think if I look at the work you've done, we're not still collecting that in one database or website or whatever. So, it would be great if we can actually use that and build upon that and make it available and accessible for everyone. So that students from this new course that hopefully will become reality, can be a starting point if they do their research, for example.

T: Okay, that's a very good insight. Do you think maybe a good, I'm thinking out of my head right now, from what you're saying, do you think the triple-bottom-line could be a good division. Because, as I said in my introduction, there's a lot of aspects linked to employment, to elitism that are kind of going towards people. We obviously have the problem of profits with vertical farming: that people are really doubting the model at the moment. And of course, the big ecological question mark as well. Do you think that could be a good starting point to think of the triple-bottom-line in this type of Jigsaw situation?

M: Yeah, yeah, for sure. It might be too broad still, but depends on it indeed. I think that's definitely interesting. To look into it from different perspectives, for sure.

G: Okay, maybe to add up to that. I think also, because I think we've applied this kind of model or this kind of practice a couple of times in school, and I think it need more practice. So instead of writing down the information on anything, I would really make sure to divide them: like different groups or students with very different topics. So that there's less like, little repetition. Because what we often experience in schools, that three or four groups have the same topic. And then everybody's kind of saying the same and then you don't enjoy presenting and the people who like listen to you are also not enjoying it because they have written the same thing. So, to really make an impact there you maybe need more than the three elements of the triple bottom line. Maybe one can look at the history, best practices, you know, these kinds of things.

T: Also thinking out of my head, so we've been taking this jigsaw right now as a kind of a starting point. What would you think about doing it as the final point? As Francesco said, the potential idea of visiting a farm, of having a more of a hands down experience. Wouldn't it be a nice thing then for them to build up a list of questions to create their presentation and they can get their actual answers from an experienced worker? So if they were to visit a farm, they can directly ask, what is your opinion on this, on this, on this, and from those information and articles they read on the site, they can build up their presentation and conclude it for the whole group?

F: If you talk about in the future of food course, they also do a lot of site visits, and this type of projects that they go and visit and they can actually get information on site. So, I think, for me, it would really match what you're saying.

G: Yeah. I think it's a nice idea. Maybe also a bit of what I think are these kind of time capsules that I think schools or like different organizations sometimes sort of plan with students. Write thoughts that people have at the time, but maybe you could kind of... Yeah, switch it around a little bit and collect like I don't know statement about okay, their current opinion on vertical farms at the beginning, before you start sharing any information, without doing any homework. And then, kind of keep those I don't know, digital post for later, and then let them do the same thing in



the very end to really be able to contrast you know. And maybe then also have a bit of the reflection sort of, okay, what they've learned through the experience on the vertical farm. You know, like how you were able to change their opinions.

T: I really liked this idea. Because it would really fit my problematic that people are somehow facing a type of miseducation. So, if you can see the before/after I really like this it and I think it's also a good thing for them to realize that within the time of a course, they can actually change their opinion about this so I think it's a very good idea Gemma. Okay, we don't have much time. So, let's move on to another topic: the experience itself. So, we've been thinking about visiting a farm which completely fits, I think, the hotelschool kind of vibe. Do you perhaps have any other idea? I know that something I have come up with is that a lot of people from my survey, they indicated that they thought products from vertical farming were not going to taste good. Do you think it would be nice, as in future of food they do a lot of tastings, to perhaps do a blind tasting where you give them like a vegetable from the supermarket and a vegetable from vertical farming, and they kind of get to see for themselves.

F: Yeah, I think that's really cool, kind of like a workshop?

T: And that would fit maybe into the visit perhaps that could be organized as well. So yeah, besides farming experience, tasting workshop, did you think that creating a farm at hotelschool would be relevant or it's a project for later?

M: Depends what timeline you're talking about. I think it would definitely be relevant, but then it's not that it's a must have for the course. But it would be nice to have, but it's more based on my gut feeling than anything else.

F: I think it also depends on the size. If it's just to show or if it's actually to produce. Because to show, you can do it. I mean, even if it doesn't produce it's just to show you, so it don't really matter. But if you want to use it, I don't know. You want to incorporate it with products there is a need for. And then you need something completely different.

T: Okay. I would need to look into it if it's true or not, but I believe one of the universities in the Netherlands build their own vertical farm it might be Wageningen university. Do you think it would be better to educate students through a vertical farm experts, so, go to a real vertical farm or to get experience from students within education and visits like another school and get the feeling from students that experience it's directly?

F: I think the second one personally, I think Wageningen is the most famous agricultural school in the world. So that's also a bit of the difference. In the sense, not to talk against Hotelschool, but like in the terms of vertical farming, they probably have way more knowledge because they're masters. There's literally masters about vertical farming. And I think there is, because I met also from the teachers, a lot of people that studied there, and I think what struck me was like, they're all really passionate about it. So even the students and they are like our age, so I think could be something very interesting, because maybe when you go to, or at least what I felt when you talk to an expert and you don't know the topic, I felt sometimes a bit awkward even asking the questions not to sound dumb. Like literally with this a student, he is just going to laugh about it. And maybe he has 80% of the knowledge of the expert, but I feel way more comfortable in asking the questions and I think I can feel the patience way more.

T: Okay, that's good insight. So, something to keep in mind for sure. Okay, so that was more of the experience part and then the last topic I kind of wanted to talk about is how can I evaluate this module. How can I see that it has planted seeds within those students and it actually made a change? We discussed already, maybe doing a presentation to see like what they have retained from the experience? Do you think of any other evaluation tools on how I can kind of test the field and see if I'm actually making an impact with the solution?

M: I like the suggestion that Gemma made: measuring it upfront until measured afterwards.



Maybe if I may come back to the previous question. I think it would be great if you can visit Wageringen. But I think what also is good to take into account that if I think about vertical farming, I think about huge vertical farms. But there's also sort of relatively small initiatives that create quite a lot of value. If you think about the vertical herbs planted. I think it's good to also take that into perspective. Because the range is very different. And then if you look at triple-bottom-line, I think there's a lot to gain from relatively simple. So, it might be good to showcase that somehow.

T: Okay.

F: I don't know if this could be possible Mrs. De Jong, but what if you actually do kind of like the creation of the vertical farm as the steps afterwards? Kind of like a possibility for students to do their LYCar in hotelschool and help launch a vertical farm? Like, perhaps from the students or future food, and see I'm gonna say like, we're gonna take maybe one or two people from each semester to see if they're interested and they can do their LYCar to help launch the vertical farm.

T: Then you would put it as a track three entrepreneurship type of thing? commissioned by the school or a specific teacher, if I understand well?

F: Yeah, I don't know if it will be track three, because track three is your own company. I think is more like track one.

M: Yeah, but it can be commissioned by SDG community. Because there's also money there, and we can make that more operational part. But that makes it feasible to actually do some experiments, I think. Yeah, to add to you, Francesco, I think, definitely it is possible, but I think there's already some ideas on paper, but it would be great if sort of students can take over and take their case to a real case and an experiment on that. Because my assumption is that it needs to have a step by step plan and the basics if you start with the basics that I think there's still a lot of potential to add information and knowledge but also actual physical plans to it. So yeah.

T: Maybe this is an outcome of the learning module. As first a confirmation whether hotelschool is ready for something like this, because I don't think there's a point in running towards a vertical farm if we see that the students are not reactive for this idea.

G: I think, in a way, maybe I'm also being very optimistic with this, but I think that there would be a very, like, there would be a lot of openness. I mean, I've also been following a big club beekeeping club kind of that's been happening, you know. And this kind of constantly reminds me of what we're talking about now. So, I think that maybe you don't need crazy many students to join in for like our kind of, but maybe to make it also an easier decision. It could be an option to just turn it into more of a... Yeah, extracurricular kind of thing. So, like a club. Maybe to build it, rather than to connect directly to LYCar because, you know, LYCar is still a very significant step. And everybody's kind of... Yeah, I don't know, academic path, sort of, so not everybody might want to commit to the risk of Okay, what if things go kind of sideways? What if there's a delay, it's not happening and then you're just kind of sitting there and you're like, gross, not going as planned. Or maybe you don't necessarily want to, like follow a career in that direction, but you would love to participate. So maybe a more voluntary kind of less commitment. And kind of option.

M: I think your question was, how can we assess deliverable? Right, so I think it depends on a bit how you integrate it. So, if you would integrate it in the future of food, I would assume that you could just use your information or the knowledge gathered from vertical farming into your final future of food, deliverables. And to be honest, I don't know what it is. It's either report or pitch. So, because then you're actually using the application to a broader set of knowledge.

T: Yeah, I think their final deliverable is they have like an outside company coming up with a challenge and you need to fix it with a solution. The problem is, I don't think every block we can make it about vertical farming. Maybe it can be the problematic for one block, but eventually...



And it's also a bit of a thing that I struggled with, because in the assessment tool, there's no test in future of food. There's not like, they don't have a written exam. They only have this challenge part. So, I don't think I can assess it. However, we can assess the consequence through the time capsule idea of Gemma, which would be enough. And I also know that in future of food, they already have like some tasting and they talk about I don't know that this whole part about also like edible consumption and everything. So, they already touch upon this topic but they don't really follow up with a written exam. So, I do think that it could fit the curriculum of future food.

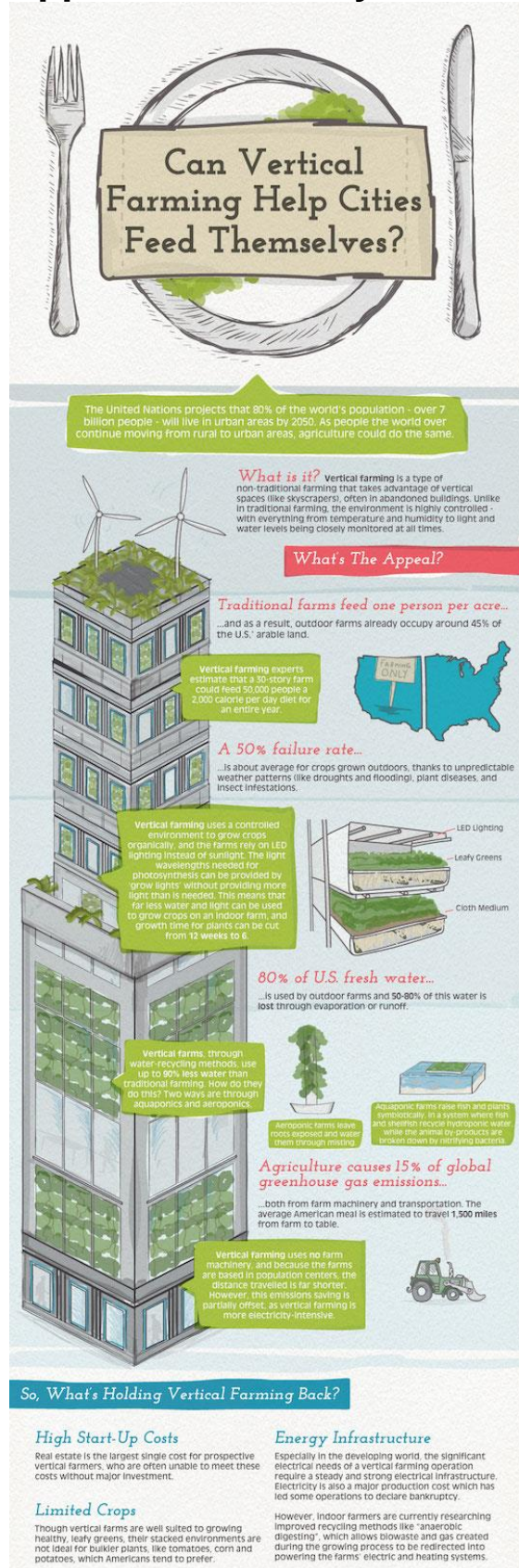
M: Yeah, I think it's nice to also see if you can build all the resources and maybe use that as a goal to expand the resources and the knowledge on online.

T: Yeah, Francesco?

F: I don't know if this could be something feasible. For example, I take maybe, as you said, you cannot do this for like, three years in a row. But what if you use it in different blocks? Because I think future food could be the beginning. Because it's probably where the people are more interested, and they could actually choose to touch on vertical farming. But then, I don't know if what you would if you use it in other blocks such as Mrs. De Jong could BMI and you take vertical farming company, as a case study. More in the future, because I don't think probably now, vertical farms would be ready for it. Their market would probably not be, let's say stabilized. So, you can actually just plant the seed with future food and then maybe you go with BMI and you grow I don't know, with SDV or something like this.

T: Yeah, I actually took the overview of the curriculum as well for the master programs of hotelschool, and I found some links some courses do link or could potentially be affected by such an idea. But as, as you say, Francesco, I think it's more of a future type of plan. If it works out the pilot works out for future foods, which remains the most relevant, in my opinion, then it could be an idea to implement it in the master's program. As I saw from my study, that a lot of ecotourist are master's students because they have more means they are more experienced with everything. So yeah, I think it's the next step.

App.7: Introductory Resource



Useful Links

Articles:

- [Vertical Farming Using Information and Communication Technologies \(infosys.com\)](https://infosys.com/)
- [Vertical Farming: Sustainable Food Never Tasted So Good \(forbes.com\)](https://forbes.com)
- [5 Exciting Vertical Farming Careers | Eden Green Technology](#)
- [Rationale for Vertical Farms](#)

Videos

- [What is vertical farming? - YouTube](#)
- [Vertical farms could take over the world | Hard Reset by Freethink - YouTube](#)
- [TEDxWindyCity -- Dickson Despommier -- The Vertical Farm - YouTube](#)

Source : [INFOGRAPHIC: How vertical farming could help cities feed](#)



App.8: Overview of HTH courses and learning objectives

Degree	Year / Block	Course	Content
Bachelor	1	Practical education	→ Practical application in restaurant, hotel and reception
		Operations	→ Explore hospitality
		Personal leadership	→ Develop personal leadership skills
		English	→ Communication in business setting
		Tutoring / skills	→ Studying effectively
		Finance fundamentals	→ Cost accounting and management accounting fundamentals
		HR / culture fundamentals	→ Understand the principles of HR functioning
		2 nd language	→ Communicating in another language
		Marketing fundamentals	→ Marketing communication plan → Market analysis → Market segmentation and mix
		Data analysis & research fundamentals	→ Analyse a problem through design-based research approaches
	2	Practical placement	→ Internship abroad
		Entrepreneurial business plan	→ Undertake an entrepreneurial project
		Extended finance	→ Feasibility of business projects → Cash flows → Time value of money
		Revenue / yield management	→ Setting prices in hotel industry
		Project management	→ Project management methodology
		Data analysis extended digital skills	→ answering complex questions based on data
		Personal development 2	→ Leadership skills
	3	Managing an outlet	→ Running a business
		Improving the outlet	→ Improve the business
		Business transformation	→ Analyse business performance of a hotel
		Business inspiration day	→ Get inspired by different companies
		Personal development 3	→ Leadership skills
	4	Minor future of food	→ Linked to what happens in the food industry
		Minor future guest experience	→ Linked to advanced marketing
		Minor future of business	→ Linked to advanced finance



		Minor future of work	→Linked to advanced HR
		LYCAR proposal	→Personal project
		LYCAR execution	→Personal project and intership
Master	1	Strategic Foresight	→Strategic planning →Future thinking strategies
		Digital development	→Impact of technology on industry → Integrating technology in hotel industry
		Sustainable leadership in the hotel ecosystem	→Models of sustainable operating
		Design Based research	→Research methods based on proper evidence collection
		Personal leadership	→Factors and biases involved in decision-making →Development of self-awareness →Development of decision-making skills
	2	Innovation and culture in hotels	→Models to create an innovative corporate eco-system →Agile and lean thinking
		Circular thinking in the hotel ecosystem	→ Triple bottom line thinking in hotel → Understanding circular economy
		Sustainable leadership and internal stakeholders	→Human resources management
	3	Transformation of the hotel	→Business model transformation for hotels
		Guest experience in the hotel industry	→ Technology entering the industry → Integrating technology for the guest experience
	4	Final thesis	→Personal research
MBA	1	Hospitality in perspective	→Understanding the meaning of hospitality commercially, privately, and socially
		Business strategy	→Analysis of strategy
		Hospitality Leadership Journey	→Leadership development
	2	Financial decisions	→Investment proposal analysis →Computing costs and revenues
		Organisation behaviour	→Human resources management
		Digital technology	→Evaluating digital technology
		Business research and consultancy project intake	→Designing a consultancy project
	3	Hospitality experience design	→ designing innovative guest / customer centred services
		Hospitality audit	→Service excellence framework



		High tech / high touch	→Big data and information handling
	4	Leading hospitality change	→Organisational dynamics →Change strategies and interventions
	5	Consultancy project	→Personal project



App.9: Research Gate dissemination

Thesis

Full-text available

The acceptance of vertical farming by the ecotourist population

October 2021

DOI: [10.13140/RG.2.2.25142.83524](https://doi.org/10.13140/RG.2.2.25142.83524)

Thesis for: Bachelor degree in Business Administration of Hospitality Management · Advisor: Katina Gikas



Tanguy de Lamartinie

App.10: Social media dissemination



ECO-TOURISM AND WILDLIFE STUDENTS HANG-OUT



À l'instant · 🌐



Dear ecotourist enthusiasts; please find the research outcomes of my work on vertical farming's acceptance by ecotourists! I would love to hear your thoughts! And do not hesitate to tell me in the comments what factors contribute to your skepticism of vertical farming, or how you think we could tackle these resistance factors! If you have any questions, send a message in comments or DM 😊
Tanguy

Have you ever heard of vertical farming? It is an innovative agricultural method developed by Professor Dickson Despommier and a group of students. The once utopia concept of growing vegetables in fully controlled and indoors environment, with the help of artificial lighting, aeration, and nutrient, has slowly become a reality.

Ecotourists, a raising type of tourists, who engage in socially and ecologically responsible activities, share common values with the underlying concept of vertical farming. Could we imagine a future where vertical farming is integrated in touristic structures to revolutionise the way we feed the World and how we provide services in the ecotourist industry? Unfortunately, vertical farming encounters quite some resistance amongst the population, and to fully exploit this raising concept, it is necessary to tackle the resistance that undermines the concept of vertical farming. Through my research process (scientific evidence collected from Academic publications and a quantitative research model), I was able to discover the four factors that mostly contribute to the unacceptance of vertical farming by ecotourist:

Vertical farming reinforces a vision of elitism due to its high prices and furthers the social gaps



Vertical farming, through its robotised systems, is a threat to the agricultural employment sector



Vertical farming does not bring any ecological added value compared to traditional methods of agriculture



Vertical farming is not realistically implementable on a large scale due to its high capital costs



Tackling those issues is the way to go to popularise the concept of vertical farming and achieve the vision of Despommier to feed the World in a responsible and innovative way. What is the first step we should take? Deconstruct the misconceptions around vertical farming and properly educate people on the benefits and costs of this agricultural method.



App.11: Dissemination to VF experts



Tanguy de Lamartinie [redacted]

16:05 (0 minutes ago) ☆ ↩ ⋮

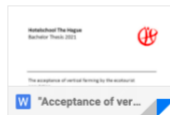
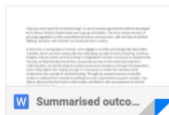
to me, bcc: info, bcc: info, bcc: welkom, bcc: info, bcc: info, bcc: info, bcc: info, bcc: INFO, bcc: hello, bcc: solutions, bcc: support, bcc: INFO, bcc: info, bcc: howdy

Dear Madam, Dear Sir,

Currently studying at Hotelschool The Hague, I am finishing my Bachelor's thesis on the topic "The acceptance of vertical farming by ecotourist". The topic of vertical farming, besides being hot and trendy nowadays, is full of promises and hope for a future where we will be able to feed everyone in a responsible and sustainable way. As experts on the topic of vertical farming, I wanted to share with you the outcomes of my research. You will therefore find enclosed the whole research component of my thesis, as well as a summarized version. I hope that my work will help you run your business and provide you with insights on how to best market/approach the ecotourist market in relation to vertical farming. Overall my findings point out that one of the main obstacles to vertical farming acceptance is the numerous and unjustified misconceptions about the concept. Consequently, I urge you to focus on educating younger generations about vertical farming, only then will people truly understand how beneficial the concept can be. I would also enjoy hearing back from you if you have any further questions or remarks on my work.

Warm Regards,
Tanguy de Lamartinie

2 Attachments




from: **Tanguy de Lamartinie** <[redacted]>

to: **Tanguy de LAMARTINIE** <[redacted]>

bcc: info@growx.co,
info@thenewfarm.com,
info@future-crops.com,
welkom@brightbox-venlo.nl,
info@floatingfarm.nl,
info@growgroupifs.com,
info@sempergreen.com,
info@onefarm.io,
info@plantlab.com,
INFO@vertical-farming.net,
hello@edengreen.com,
solutions@netled.fi,
support@art techno.nl,
INFO@growpodsolutions.com,
info@gothamgreens.com,



App.12: Dissemination to hospitality businesses


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THE HAGUE

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Tanguy de Lamartinie
a few seconds ago

...

Dear HTH community!!

Ever been interested to grow your own crops for your F&B outlets? Have you ever considered vertical farming (a trendy urban farming concept)?

Find out more about vertical farming and the perception of the ecotourist market with regards to this novel concept in the research outcomes of my LYCar thesis:

[\(PDF\) The acceptance of vertical farming by the ecotourist population \(researchgate.net\)](#)

Don't hesitate to reach out if you have any comments, any suggestions, or any new insight from your business or your development trajectory!




App.13: ResearchGate dissemination reactions

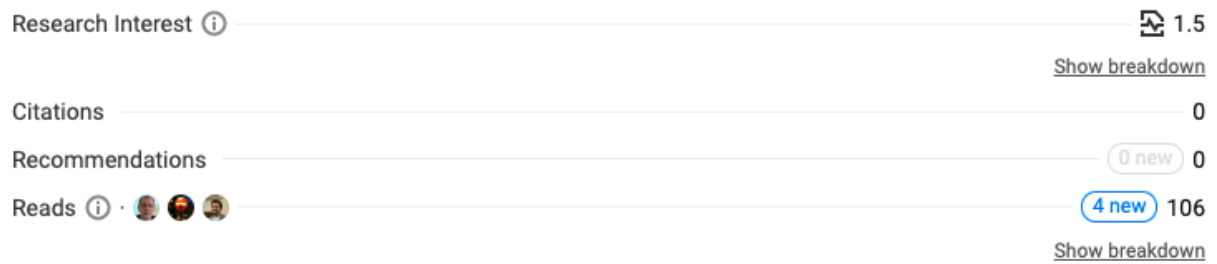
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DOI: [10.13140/RG.2.2.25142.83524](https://doi.org/10.13140/RG.2.2.25142.83524)

Thesis for: Bachelor degree in Business Administration of Hospitality Management · Advisor: Katina Gikas

 Tanguy de Lamartinie



App.14: Social media dissemination reactions



Eco Tourism

Unfortunately, vertical farming encounters quite some resistance amongst the population, and to fully exploit this raising concept, it is necessary to tackle the resistance that undermines the concept of vertical farming. Through my research process (scientific evidence collected from Academic publications and a quantitative research model), I was able to discover the four factors that mostly contribute to the unacceptance of vertical farming by ecotourist:

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5

2 commentaires

J'aime

Commenter

Partager



Grace Butler

This is really interesting! As someone that is intrigued by the possible solutions to the current agricultural crisis we are facing I have more open thoughts towards vertical farming, I feel it has the opportunity to increase yields closer to urban areas, which makes fresh food more accessible with lesser carbon footprint - however I dread to think of traditional methods dying and the impact this could have on society and the environment. I think a hybrid approach would work wonders, as regenerative agricultural methods progress and (hopefully) scale!

...

J'adore · Répondre · Partager · 4 sem



1



App.15: VF experts dissemination reactions



quoterequest | Sempergreen Vertical Systems <quoterequest@sempergreen.com>

to Paul, me ▾

Mon, 1

Goodafternoon Tanguy,

Thank you for your interest in Sempergreen and sharing your thesis! I can tell you did put a lot of effort into it. It's nice to read that you did implemented practical tips and tricks.

I'll pass down your research to Paul, the accountmanager of the BeNeLux. When we've further questions, we'll surely contact you.

Wishing you all the best with your study and have a wonderful day!

Met vriendelijke groet, Kind regards, Mit freundlichen Grüßen,

Adrianne Kerst

Sales Medewerker



info GROWx

to me ▾

Hi Tanguy,

Thanks for the thesis!

It's very insightful and we'll definitely learn something from it.

Met vriendelijke groeten,

Laura van de Kreeke

Keienbergweg 26 | 1101 GB Amsterdam | +31 6 28976519 | www.growx.co



...

...



Floating Farm Info

to me ▾

Dear Tanguy,

Thanks for sharing.

This could be really be helpful for us. I'll read your outcomes later.

Good luck!

Vriendelijke groet,

MINKE VAN WINGERDEN

Partner





App.16: Proof of Data Management upload



noreply <noreply@hotelschool.nl>

Sam 11/12/2021 17:15



À : Tanguy Pechoultré de Lamartinié

Dear Tanguy Pechoultré de Lamartinié,

This is an automatic delivery message to notify you that a new file has been uploaded.

Name : Tanguy Pechoultré de Lamartinié

Student Number : 672055

Email : 672055@hotelschool.nl

LYCar Coach : Katina Gikas

Research Number : 2021-250

We kindly request you to forward this email to your LYCar coach as evidence that your data files have been uploaded securely.

Thank You.



noreply <noreply@hotelschool.nl>

Sam 11/12/2021 17:15



À : Tanguy Pechoultré de Lamartinié

Dear Tanguy Pechoultré de Lamartinié,

This is an automatic delivery message to notify you that a new file has been uploaded.

Name : Tanguy Pechoultré de Lamartinié

Student Number : 672055

Email : 672055@hotelschool.nl

LYCar Coach : Katina Gikas

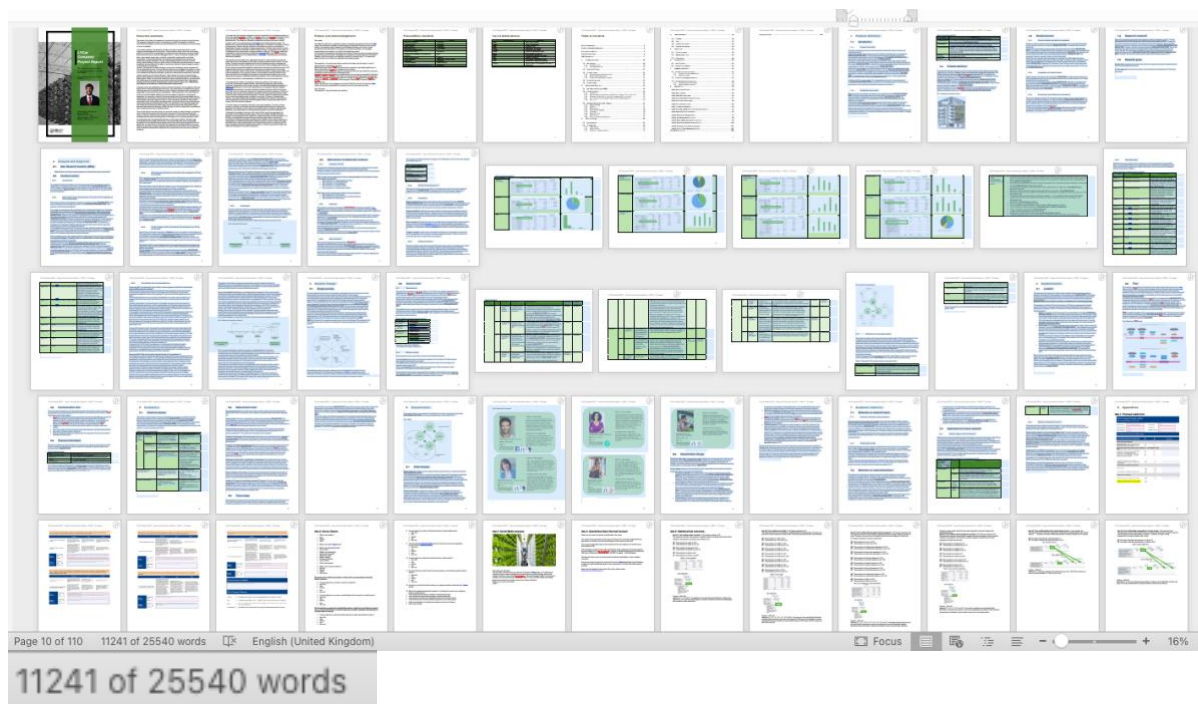
Research Number : 2021-250

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Thank You.



Proof of word count



Words in body: 11241 words

Words in figures: 755 words

Total number of words: 11996 words



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