

The Feasibility of Cargo Bikes for Business in Ōtautahi



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1 Executive Summary

Context

- As Christchurch continues to grow and develop, cargo bikes are becoming an increasingly popular mode for transporting goods. In collaboration with Ken Ching from Action Bicycle Club, this research project aims to answer the following two research questions:
 1. Do the benefits outweigh the barriers for businesses using cargo bikes in Ōtautahi?
 2. What are potential solutions to increase usage?

Methods

- Our research has included quantitative surveys of potential users to understand potential concerns, as well as qualitative interviews with current users to determine current benefits and barriers to inform practical solutions.

Key findings

- Key findings of the research include social, environmental and efficiency benefits for current cargo-bike users. Key reported benefits include time savings, lower emissions, parking convenience, health advantages and long-term cost reductions. Barriers were also identified including weather-related issues, cost, infrastructure limitations and cultural stigma. These barriers were used to inform solutions to increase uptake for non-users.

Limitations

- The main limitations identified were the small survey and interview sample sizes, cultural aspects and stigma around cycling.

2 Introduction

As the urban population rises, environmental, economic and transportation challenges increase with it. The future of cargo bikes appears promising, positioning them as a sustainable transport solution in Ōtautahi. Compared to conventional petrol or diesel-powered vehicles, cargo bikes offer several advantages, including reduced emissions, lower environmental impact and health and wellbeing benefits. These benefits highlight the pivotal role of cargo bikes in fostering efficient and sustainable urban transport. A cargo bike refers to any modification made to a standard bicycle to increase carrying capacity.

Urban transport contributes significantly to greenhouse gas (GHG) emissions. The New Zealand Government emissions reduction plan (2022) highlights the role of transport in reducing emissions. In particular, the plan calls for a 41% reduction in transport sector emissions from 2019 levels by 2035 (New Zealand Government, (2022)). Increased adoption of cargo bikes holds the potential to decrease emissions from the transport sector. Furthermore, active transport modes have been shown to have positive social and individual health and well-being benefits (Bourne et al., 2018; Bjørnarå et al., 2019; Houlden et al., 2018). As highlighted by Wrighton & Reiter (2016), cargo bikes are well-suited for urban

environments characterized by grid-based layouts and short travel distances. This makes them an excellent choice for last-mile delivery and business use in Ōtautahi, especially given the city's grid-like layout and flat topography.

While cargo bikes are gaining popularity overseas (ECF, 2022), certain barriers to adoption exist in Ōtautahi. With strategies to overcome these barriers, cargo bikes may become a medium that benefits both businesses and the community, for a more sustainable, efficient and fun Ōtautahi.

This report will cover a literature review, methods, results, discussion, and recommendations in the context of our research questions:

- Do the benefits outweigh the barriers for businesses using cargo bikes in Ōtautahi?
- What are potential solutions to increase usage?

3 Literature Review

The literature review explores various perspectives on the adoption of cargo bikes as a mode of urban transportation. It was divided into two sections: benefits and barriers, with further subsections. For benefits, environmental, health and well-being and an international perspective on the topic were highlighted. The review also includes barriers, specifically relating to infrastructure, theft and security concerns, the need for skills and experience, financial cost and the stigma associated with unconventional transport modes.

3.1 Benefits

3.1.1 Environment

Browne et al. (2011) conducted a trial in London based on before and after evaluations of urban freight deliveries in the central city. Replacing diesel vehicles with cargo bikes and electric vans, results showed that CO₂ emissions per parcel delivered dropped by 54%. Greenhouse gas emissions, air quality, road congestion and noise pollution are all improved with the implementation of cargo bikes (Büttgen et al. 2021; Browne et al., 2011). Franco et al. (2013) states road transport often appears as the single most important source of urban pollutant emissions and that outdoor air pollution is estimated to cause 1.3 million annual deaths worldwide. The environmental impact of an end-of-life cargo bike is much less than that of standard delivery vehicles (Temporelli et al., 2022). The volume of waste is small and recyclable materials are often used; however, the batteries may need regular replacement.

3.1.2 Health and Well-Being

Cargo bikes are an active transport mode that can mitigate poor health outcomes associated with lower physical activity. Research by Houlden et al. (2018) found that outdoor physical activity improves quality of life and helps to alleviate psychological stress. In addition, using bicycles can encourage people to engage in regular physical activities, and promote cardiovascular health, muscle strength, and overall endurance (Bourne et al., 2018 ; Bjørnarå et al., 2019). A robust connection exists between individual health and workplace productivity, where healthier individuals consistently demonstrate heightened levels of cognitive performance (Bourne et al., 2018).

3.1.3 International Perspective

China caters for all kinds of bikes and loads, with designated lanes that crossover both urban and rural areas. These bike lanes are separate from other traffic lanes on the road, enhancing road safety for all users (Li et al., 2013). The Chinese government has implemented subsidies and environmental incentives to encourage the use of bikes (Liu & ClimateWire, 2011).

It is worth noting that the success of cargo bikes in China is largely due to the country's dense urban population and the pursuit of efficient and economical transportation solutions (Gao et al., 2019). The rise of e-commerce has further accelerated this trend (Temporelli et al., 2022).

3.2 Barriers

3.2.1 Infrastructure

Cargo bikes can struggle with infrastructure designed and built without their needs considered. Infrastructure often lacks stopping, turning, and parking bays (Masterson, 2017). Due to cycle lane width, cyclists are often forced to merge with traffic, negatively impacting the perception of safety (Thoma & Gruber 2020).

3.2.2 Skill and Experience

Additional skills training may be required when handling cargo bikes, as employees with low cycling experience may present lower acceptance of cargo bikes in the workplace (Thoma & Gruber, 2020). This can result in employee pushback and resistance to change (Blazejewski et al., 2020).

3.2.3 Cost

Thoma & Gruber (2020) and Blazejewski et al. (2020) identified implementation cost as a barrier and is amplified by Narayanan & Antoniou (2022) when considering one standard van may have to be replaced by multiple cargo bikes due to payload and carrying capacity restrictions. Although vehicle costs are similar between cargo bikes and second-hand vans, the perceived financial risk is higher for cargo bikes due to the 'tried and tested' nature of a delivery van (Blazejewski et al., 2020).

Additionally, licensing and insurance for cargo bikes are not standardized, so the inconvenience of licensing and insurance relative to vehicles puts businesses considering cargo bikes as a delivery option at a higher perceived risk (Blazejewski et al., 2020).

3.2.4 Stigma

The stigma around cycling is decreasing, however, it still exists. A study by Jones et al. (2016) investigated the experiences of e-bike riders and showed that they sometimes faced general comments and teasing from colleagues and comments from the public. For some cycling is viewed as a mode of transport that 'other people' do (Hopkins & Mandic, 2017). Cargo bikes are considered unusual and different, especially compared to traditional modes of transport such as vans or small trucks.

3.3 Linking the literature to the research question

These findings contribute to a nuanced understanding of the landscape of literature relevant to cargo bikes. They highlighted specific aspects of our research to explore whether the benefits of cargo bikes

outweigh the barriers in an Ōtautahi context. Additionally, the barriers identified in the literature review helped to inform possible solutions for uptake.

4 Methods

Both qualitative and quantitative research methods were used to understand the benefits and barriers of cargo bike use for current users and non-users. Qualitative data was initially collected through semi-structured interviews with two current users representing diverse perspectives. Complementing this qualitative approach, a quantitative business survey was carried out for non-users, featuring a diverse range of businesses in Ōtautahi. This was done to provide further insights into the challenges and opportunities surrounding cargo bike adoption.

4.1 Qualitative Data

In addressing the question of whether the benefits outweigh the barriers for businesses utilizing cargo bikes in Ōtautahi, a series of semi-structured interviews were conducted with two organisations that use cargo bikes in their operations: Beam Mobility and Toha Kai. Beam Mobility, a for-profit national company with a strong focus on sustainability, and Toha Kai, a locally owned social benefit enterprise specializing in providing healthy food with low economic and environmental costs, offered distinct perspectives despite the limited sample size.

To explore the benefits, challenges, and potential barriers to wider adoption, the interview questions covered a variety of topics (Appendix A). Encouraging participants to share specific examples and insights about their cargo bike experiences facilitated an understanding of the initial benefits and barriers associated with cargo bike adoption for their businesses. A comparative analysis of the two initial interviews sought to identify commonalities and discrepancies, recognising that any shared benefits or barriers could be indicative of broader trends applicable to future cargo bike users.

As the data analysis progressed, it became evident that additional perspectives and insights would be valuable. Subsequently, a third interview with Mourea Coffee in Rotorua was conducted. Additionally, recognizing the significance of infrastructure and cultural factors as more substantial barriers than initially anticipated, a fourth interview was carried out with John Lieswyn, director and principal transport planner at ViaStrada. John is involved in policy-making decisions for infrastructure planning in Ōtautahi.

Maintaining continuity with the initial set of questions from the first two interviews, the latter two interviews introduced supplementary questions focused on culture and infrastructure. This expansion aimed to gain deeper insights into the specific factors hindering the widespread adoption of cargo bikes in Ōtautahi, as well as some general aspects of transport culture.

Upon completion of all interviews, an additional data analysis was undertaken, comparing and contrasting the perspectives of the three businesses. John Lieswyn's insights were integrated into the analysis, with a specific focus on aspects relevant to both personal and business usage of cargo bikes. This approach ensured that the data considered in answering the initial questions remained applicable while allowing for further scope in a general cultural context.

4.2 Quantitative Data

A comprehensive survey was conducted with non-users to gain deeper insights into perceived benefits and barriers to incorporating cargo bikes into their businesses.

Various businesses, including roasteries, whole foods, screen printers, distilleries, breweries, grocers, and cafes, were approached in person for participation. The Canterbury University cargo bike was used for one day, creating a dynamic approach to engaging with businesses. Visited sites had the option to complete the survey on a provided mobile device, provide a contact email for an emailed survey, or decline participation. Despite most businesses opting out, a total of nine businesses responded to all survey questions, with three others providing partial responses and not being included in the results section.

The non-user survey was modelled after Thoma & Gruber's (2020) drivers and barriers survey. It was constructed using the Qualtrics survey builder and comprised seven distinct topics, each featuring a set of questions. To mitigate potential response bias, questions on the same topic were dispersed throughout the questionnaire. This strategy prevented respondents from providing uniform responses merely due to question grouping, which might not accurately reflect their true beliefs. Furthermore, this approach kept respondents engaged by varying the subject matter of the questions.

Originally, bar charts were used to visualize the collected data, later transitioning to stacked charts in the results section for enhanced clarity and ease of comparison.

Covering a diverse range of factors that may impact decision-making related to cargo bike utilization—including infrastructure, staff attitudes, perceived risks, practical considerations, and cost-related aspects—the survey provided a comprehensive understanding of the challenges and opportunities faced by businesses considering the adoption of cargo bikes.

5 Results

5.1 Semi-Structured Interviews Results

Semi-structured, qualitative interviews with businesses currently utilising cargo bikes in Ōtautahi. These interviews offered a deeper insight into the experiences and viewpoints of current cargo bike users. The interviews consisted of open-ended questions (Appendix A), but not all questions were asked to all participants. This is because the infrastructure and culture questions were only added after the interviews with Beam and Toha Kai. As well as this, the semi-structured nature of the interviews meant that some questions would be answered during a discussion.

Tables 1 to 3 present the results of the interviews. The interview questions covered a wide range of topics, from benefits and challenges to potential strategies for promoting cargo bike adoption.

Table 1: Benefits mentioned in interviews.

Benefit	Description	Experienced by
Quick way to get around	Using a cargo bike is a quick way to get places especially in a city centre or when there is bad congestion. Often it is no slower than a courier.	Beam Mourea Coffee Toha Kai John Lieswyn
No carbon emissions or more sustainable	Using a cargo bike is a carbon emission free mode of transport.	Beam Mourea Coffee Toha Kai
Easy to park	Parking is less of a problem than finding car parks. You can often park closer to your destination and without paying.	Beam John Lieswyn
Great way to get outside	A good way to spend a few hours outside and cycling around the city.	Mourea Coffee Toha Kai
Cargo bike works for advertising	Since cargo bikes are not very common, they work as a tool for advertising	Mourea Coffee
Cheaper to run long term	Without the expense of petrol, it is cheaper in the long term.	John Lieswyn

Table 2: Barriers mentioned in interviews.

Barrier	Description	Experienced by
Cost	An enterprise level cargo bike is \$15,000 or \$20,000, which is a significant financial investment for a business.	Beam Toha Kai John Lieswyn
Hard to manoeuvre	Cargo bikes, especially front loaders are harder to turn which makes it harder, or impossible to get through certain areas such as railway chicanes. This seems to be more of an issue on the trikes.	Beam Mourea Coffee John Lieswyn
Narrow cycle lanes	The cycle lanes are too narrow for some cargo bikes. Additionally, some people get impatient behind a cargo bike and take risks.	Beam Mourea Coffee Toha Kai

Weather	Rain is not desirable for deliveries, even if the cargo is protected. Wind can also be an issue and slow down deliveries.	Beam Mourea Coffee Toha Kai
Battery capacity	The batteries do not last long and cost \$1,000. Carrying a spare battery also increases weight.	Mourea Coffee Toha Kai
Car culture	People are quite aggressive on the roads.	Beam Mourea Coffee
Parking	The length of some cargo bikes can make it difficult to find suitable parking spots on the footpath. Additionally, to get onto the footpath, locating a curb ramp is almost always necessary.	Mourea Coffee John Lieswyn
Servicing	Cargo bikes have a few complexities and skills required to maintain them, and if a part is required you often have to wait two or three weeks to get it repaired.	Beam Mourea Coffee
Battery charging time	The batteries can take seven or eight hours to fully charge, but can be depleted in an hour and a half.	Toha Kai
Finding employees to use cargo bikes	Some employees are not interested in using cargo bikes.	Beam
Hills	It is often impossible to deliver uphill, or even up steep driveways.	Toha Kai
Poor infrastructure	Some cycle lanes are not fit for purpose, bumpy and unpleasant and unusable if transporting fragile cargo like glass jars.	Mourea Coffee
Security	There are some security concerns but not significant if you invest in locks and GPS devices.	John Lieswyn

Table 3. *Ungrouped comments.*

Other	Notes	Interviews
Government incentives – Yes	Believes it should be part of the clean car scheme. Believes it should be offered for e-trikes and e-bikes, but still thinks that change is more likely to come from grassroots.	Beam Toha Kai
Government incentives – No	Thinks that subsidy money could be better spent improving cycle infrastructure etc. Making it harder to drive and easier to use cargo bikes will increase the number of people using them.	John Lieswyn Mourea Coffee
Cargo bikes require a mindset shift	For both business use and personal use, cargo bikes require a mindset shift. This is related to the current culture around cargo bikes.	Toha Kai John Lieswyn
Safety	The perception of safety is one of the biggest barriers for non-users	John Lieswyn

5.2 Non-User Survey Results

The questionnaire was sectioned into seven distinct topics, with each topic featuring a set of questions rated on a Likert scale ranging from 1 (I completely disagree) to 5 (I completely agree), as shown in Table 4.

Table 4: *The meaning of each score in the survey.*

Value	Description
1	I completely disagree
2	I somewhat disagree
3	I don't agree or disagree
4	I somewhat agree
5	I completely agree

Figures 1 to 10 show the results of the non-user survey. Figures 1 to 4 are barriers and Figures 5 to 7 are benefits. Figures 8 to 10 show survey responses to the current delivery method, willingness to adopt and opinions on incentives.

Figure 1. Rating chart for the Infrastructure Constraints section.

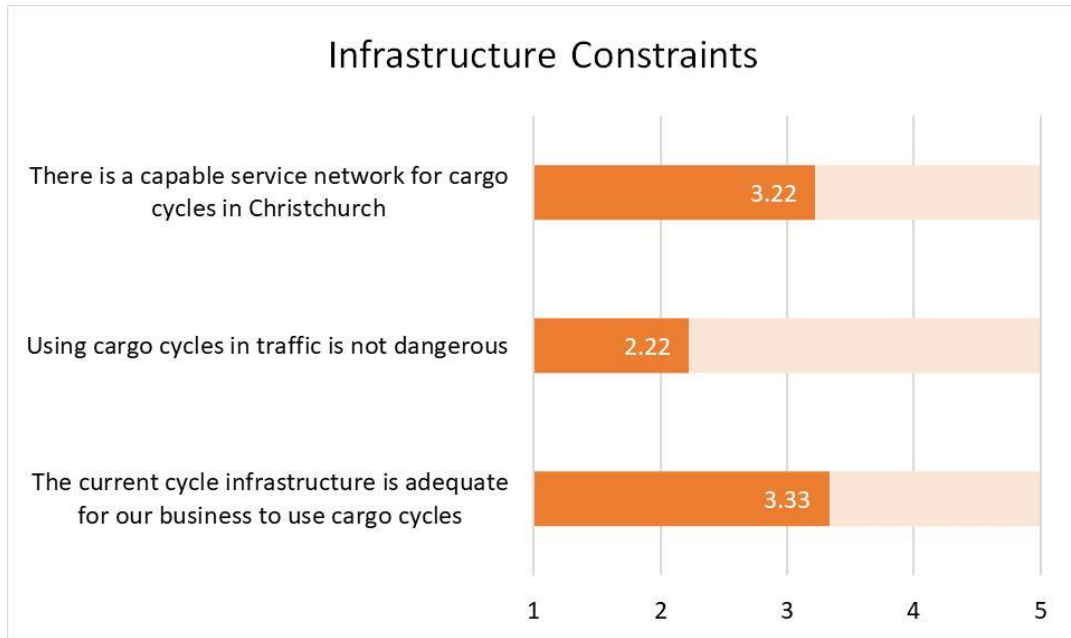


Figure 2. Rating chart for Riders Concerns section.

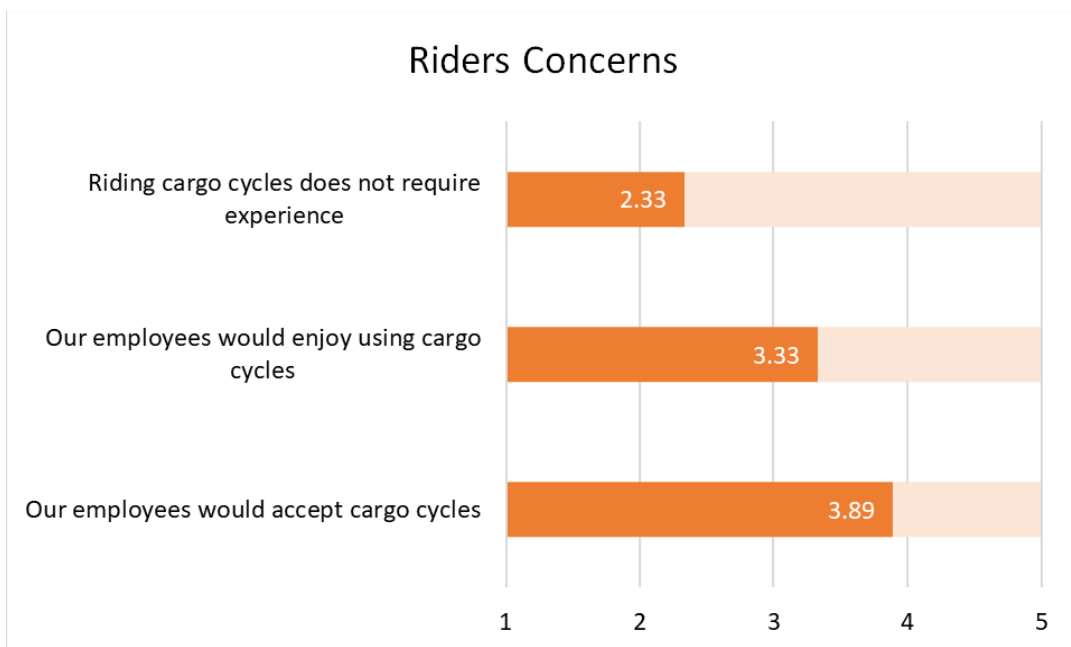


Figure 3. Rating chart for Worries and Perils section.

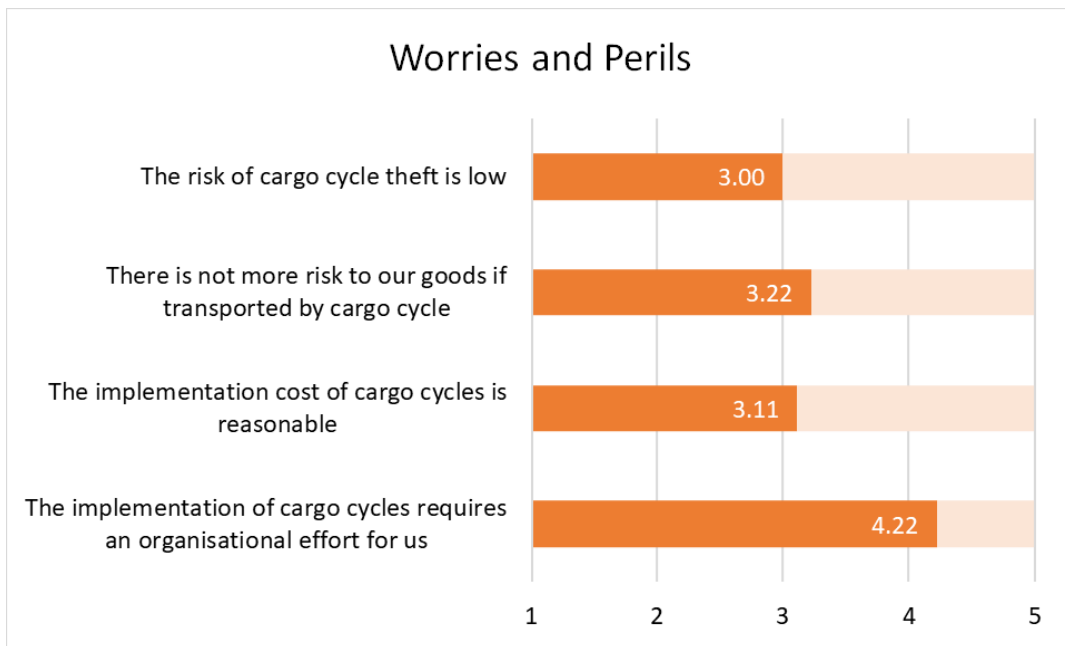


Figure 4. Rating chart for Vehicle Limitations section.

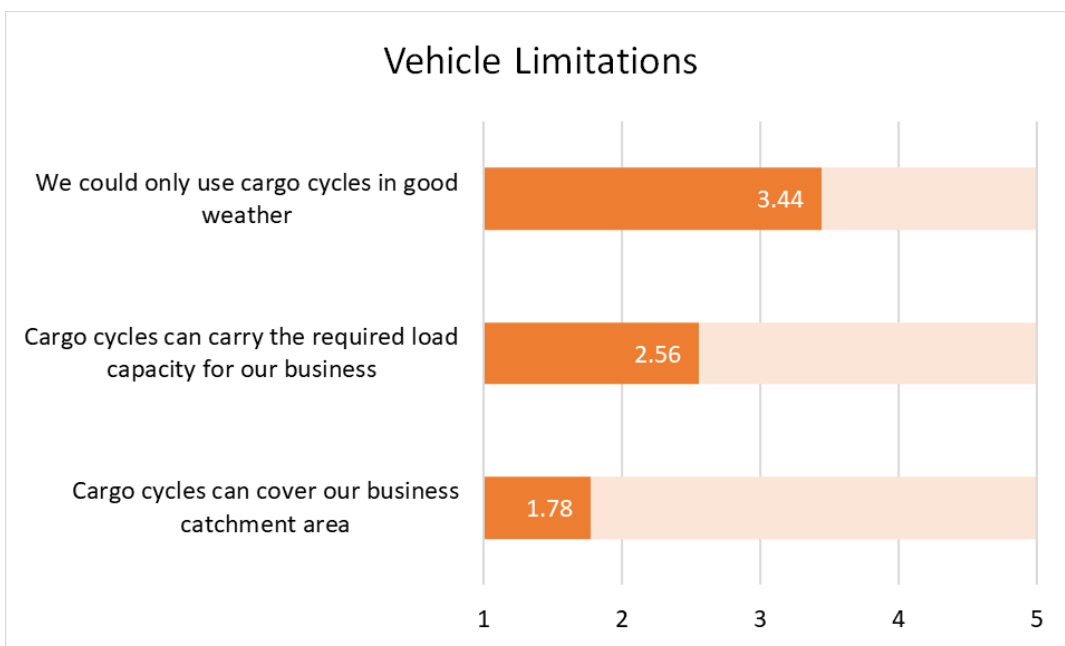


Figure 5. Rating chart for Soft Benefits section.



Figure 6. Rating chart for Cost Benefits section.

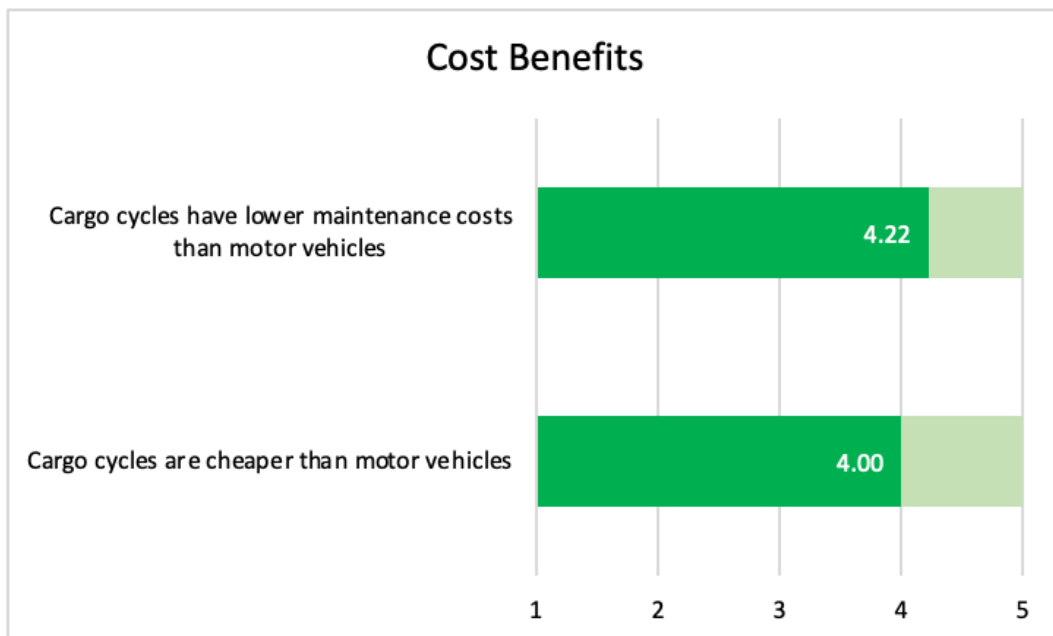


Figure 7. Rating chart for Urban Advantages section.

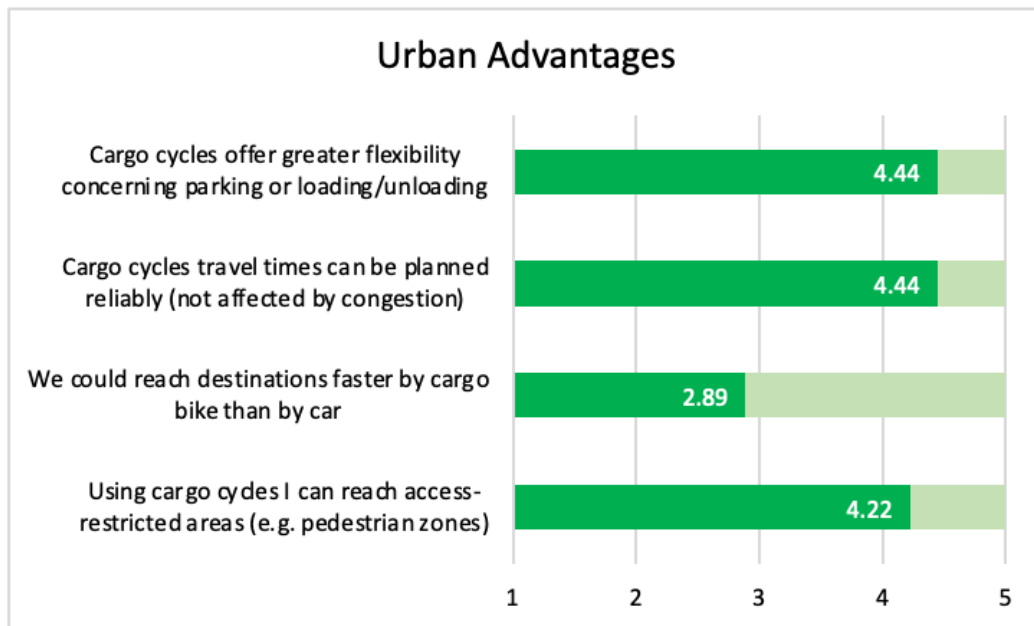


Figure 8. Shows a pie chart from the non-user survey primarily based on how the business currently delivers or provides its service.

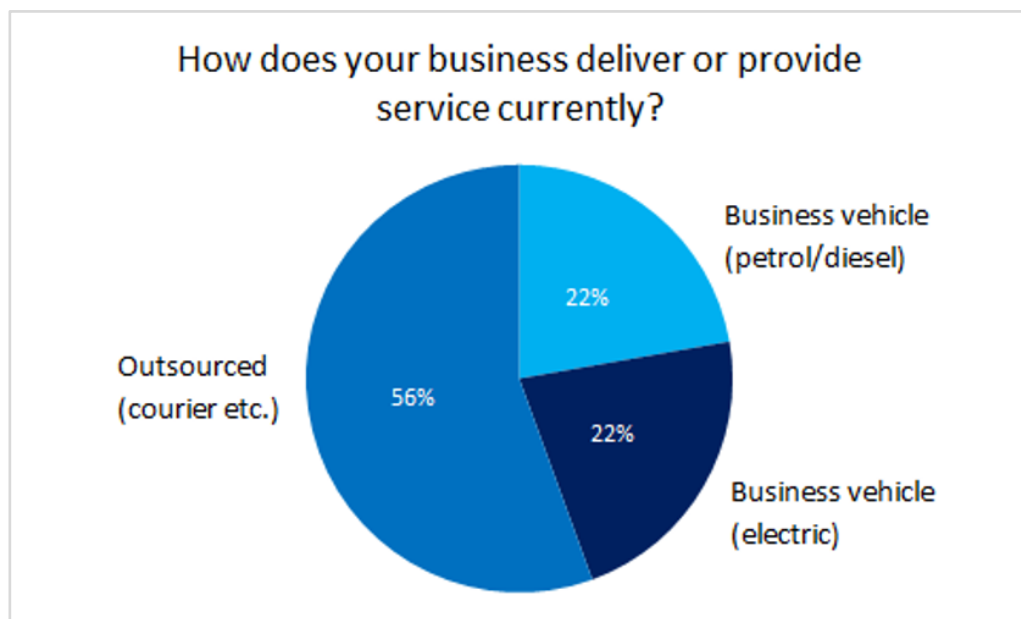


Figure 9. Shows a pie chart from the non-user survey discussing whether businesses have considered cargo cycles as an option for business.

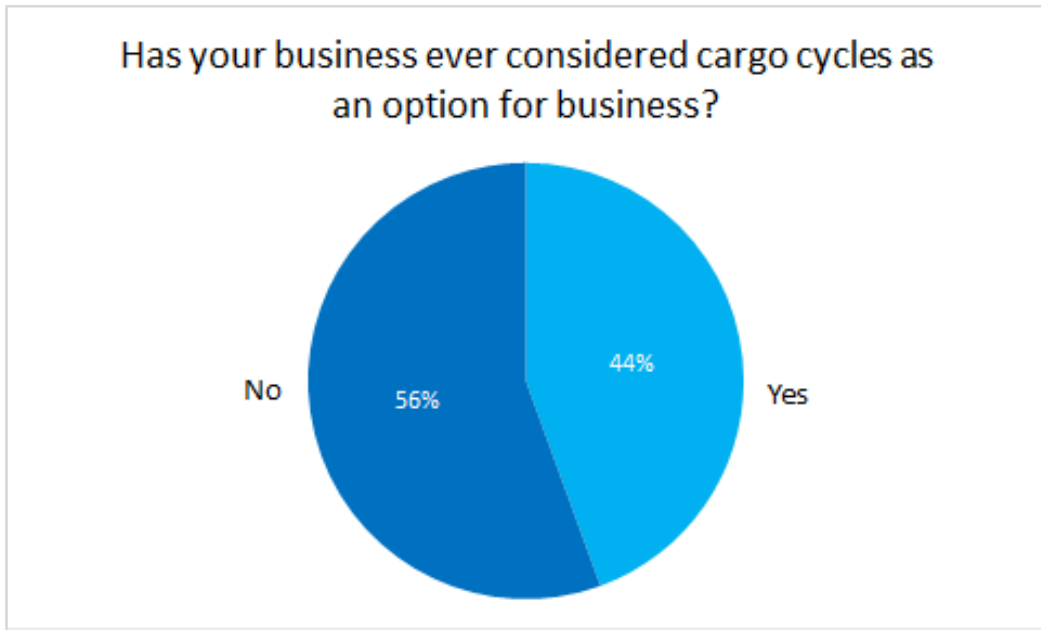
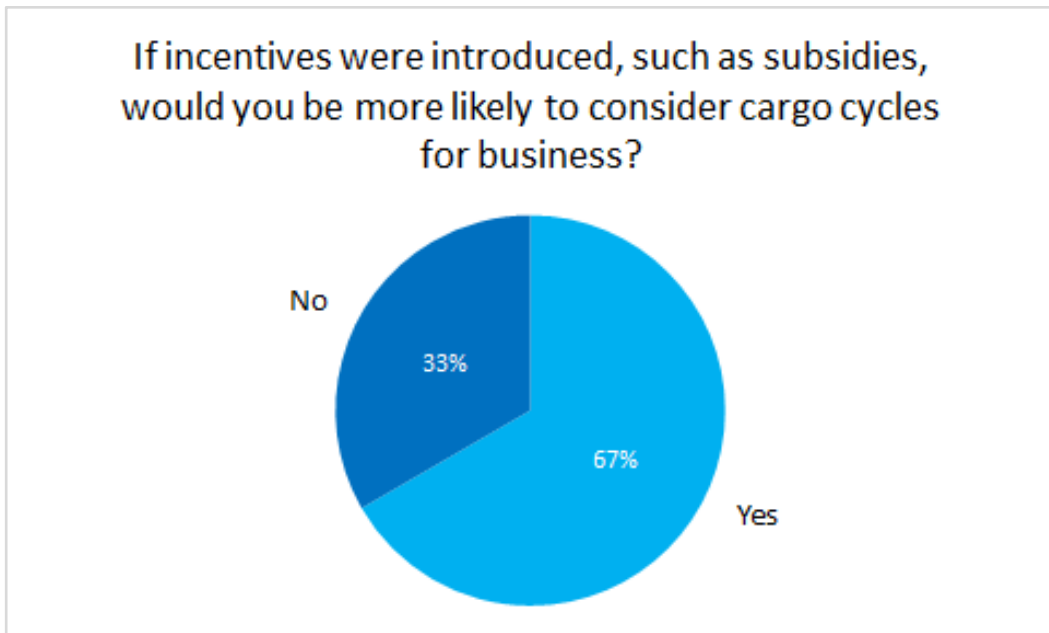


Figure 10. Shows a pie chart from the non-user survey discussing whether businesses would consider cargo cycles if incentives were introduced.



6 Discussion

6.1 Significance of Results

The results of the interviews provide valuable insights into the benefits and barriers currently experienced by cargo bike users while the survey provides an insight into the perceived benefits and barriers from a non-user perspective. To be expected, results varied dramatically between users and non-users. Due to the similar nature of questions used in interviews and the survey, it provided an opportunity to compare the views of the users with real-world experience, against the non-users, where results are more likely affected by stigma, culture and perception of cycling, instead of experience.

6.1.1 Benefits

Within the survey, there was strong agreement that cargo bikes can help businesses achieve their environmental goals. Mourea Coffee suggested that the type of people using cargo bikes are those that have additional environmental motivations that move beyond the business. Environmental benefits of cargo bike adoption may be considered an isolating factor, as if they are only for businesses with positive environmental intentions, however many other benefits can be considered.

Interview participants highlighted time efficiency as a key benefit. On the other hand, survey participants neither agreed nor disagreed, likely due to the lack of cargo bike experience. Survey participants were also unlikely to consider aspects such as ease of parking within time efficiency. Mourea Coffee pointed out that this time efficiency is reduced when considering a rural setting. However, in an urban setting, with traffic congestion, parking accessibility and reduced vehicle speeds considered, interview participants stated cargo bikes are faster. John Lieswyn said, "It saves time, not just on your commute, on any trip purposes, it is faster than driving."

Non-users had a more negative perception of safety than users. For non-users, survey responses trended toward cargo bikes being dangerous to use in traffic, whereas this issue was not mentioned by most interview participants. This perception of safety is a barrier best described by John Lieswyn when he said, "I can tell you the benefits of cargo bikes, but if users feel threatened by drivers, it doesn't matter how fast it is, users just don't want to be intimidated by drivers." This perception of safety, likely among other reasons, contributes significantly to cargo bike job recruitment challenges. Beam expressed the challenges of training people across from vans to cargo bikes and rarely finding people who were keen for cargo bike-specific roles.

An unexpected benefit mentioned by Mourea Coffee is the advertising opportunity provided by cargo bikes. Riding around on a rolling billboard is a promotional tool, and Mourea Coffee believe it's working. They said, "I don't think my company would be doing as well as it is doing if I was just driving around, I don't think I would have had as many sales". They also mentioned getting outside as a key benefit. These two identified benefits relate to the business image and employee health questions in the survey, which showed positive agreement among survey participants.

6.1.2 Barriers

On the other hand, there are plenty of barriers mentioned. Two of the most common barriers, experienced by three out of the four interview participants was the impact of weather and cost. Mourea Coffee stated "I would not go out in the wind", and that "...when I have staff, it's kind of a whole other question really making other people go out there [in the rain]". Furthermore, Toha Kai

expressed that while wind increased travel time and decreased battery life, the rain wasn't an issue. While some users (predominantly business owners) do not mind completing trips in rainy weather conditions; wind can impact trip efficiency and employee perceptions. Cargo bikes cost upwards of \$10,000 (Action Bicycle Club, 2023) which is a significant investment. In addition to this, batteries cost around \$1,000 and take around 7 to 8 hours to charge. As well as this, many participants saw repairs as difficult and costly compared to traditional delivery modes due to parts being difficult to source and ongoing maintenance.

More barriers identified by interview participants were safety and, the suitability of the current cycle infrastructure. While the businesses currently using cargo bikes do find the benefits outweigh the barriers, safety on the road is paramount for any user of a cargo bike. John Lieswyn states, "I can tell you the benefits of cargo bikes, but if users feel threatened by drivers, it doesn't matter how fast it is, users just don't want to be intimidated by drivers", he believes that this is likely to be the biggest barrier for new users.

The identified group of businesses that were suitable for cargo bike adoption was much smaller than expected. Businesses with small delivery loads can use a standard bicycle and those with large delivery loads often require a traditional delivery vehicle. Additionally, many businesses that fit into this 'niche', believe that their needs cannot be met by a cargo bike. There may however be a case for cargo bike adoption within the courier service, with over half of survey respondents using outsourced deliveries.

When asked about government incentives, the interview participants were split. Two believed that government incentives would increase adoption, while the other two believed that it could be better spent improving cycle infrastructure and disincentivising vehicles. Around two-thirds of survey participants believed that their consideration would increase with incentives.

6.2 Coffee Roastery – Case Study

Despite being identified as a business type that fits into the 'happy medium' niche for cargo bike adoption, almost all the coffee roasteries that were surveyed viewed cargo bikes as unfit for their needs. Instead, these businesses used either petrol, diesel or electric vehicles and typically delivered 1 to 2 days per week. Mourea Coffee is a roastery located in Rotorua that has successfully adopted a long-john cargo bike and believes that the benefits do outweigh the barriers and that business ethos and priorities are the deciding factors. Mourea Coffee is an environmentally focused business, mitigating its carbon footprint by roasting in off-peak times and offsetting its emissions following carbon accounting. In 2022, it emitted 2.1 TCO₂E (tonnes of carbon dioxide equivalent) and offset this by donating approximately 6 TCO₂E to Trees That Count (Mourea Coffee, 2022). Mourea Coffee believes that the barriers to cargo bike use are battery price and availability, infrastructure quality, rural travel times, servicing availability, staff recruitment and weather challenges are outweighed by the benefits. These benefits are easy advertising and positive publicity, reduced carbon footprint, fluid inner city delivery runs, standing out from other businesses and a positive self-image. Overall, Mourea Coffee thinks that the cargo bike has contributed greatly to their business's success. Mourea Coffee is a similar size to many roasteries in Ōtautahi, and similar success can be expected with cargo bike adoption, especially when considering Ōtautahi's cycle infrastructure, servicing availability and lower annual rainfall in comparison to Rotorua.

6.3 Hamburg, Germany – Case Study

Many European cities have among the highest cycling rates globally. An example is Hamburg, Germany. The key differences that have been identified between Hamburg and Ōtautahi are infrastructure, incentives and culture. Ōtautahi is making good progress on cycle infrastructure although is still far

behind Hamburg and its 280km cycle network, cargo bike parking and inner-city-wide 30km speed limit for vehicles (ECF, 2022). Hamburg also offers businesses an approximate \$4,500NZD incentive per cargo bike, with an annual budget of almost \$1.3 million New Zealand dollars in 2020 (ECF, 2022). Inclusivity and equity are also addressed in Hamburg, where accessible cargo-bike share options are available and cargo bikes can be rented for as low as \$1.8NZD/hour (ECF, 2022).

6.4 Recommendations

6.4.1 Infrastructure

Continuous maintenance and expansion of Ōtautahi's cycle network, as well as the implementation of cargo bike parking, wider lanes and pull-in bays, can ensure adequate infrastructure for businesses considering cargo bike adoption. Infrastructure can also be used to disincentivise vehicles, making the cargo bike a more favoured choice. Examples may include further reduced vehicle speed zones and increasing filtered permeability, positively impacting cargo bike efficiency.

6.4.2 Incentives

In contrast, incentives provide mitigation to financial barriers and provide the top-down support that helps to legitimise cargo bikes as an option for businesses. As Ken Ching stated in the interview "We're missing the carrot on the stick that other countries have". Ōtautahi would benefit from a similar incentive programme to Hamburg, Germany, or an extension of the current clean car rebate to businesses considering cargo bike adoption. Another relevant funding option is Waka Kotahi's Hoe ki angitū- Innovation fund, specifically for integrating low-emission travel solutions in the private sector.

6.4.3 Culture

Cycle culture is broad and difficult to define, improving it without defining 'it' is even more difficult. Ōtautahi has an array of grassroots initiatives that enhance cycle culture such as community workshops and cycle lessons for minorities, however, these initiatives are lacking top-down funding or support. Providing these ground-up initiatives with top-down support not only helps to legitimise cycling to the mainstream but also addresses equity and inclusivity. Improving cycle culture through legitimisation within the business space is essential for increasing adoption rates. Offering businesses that may be great candidates the opportunity to trial cargo bikes would allow businesses to form their own perspectives on the benefits and barriers of this mode, replacing prior assumptions due to culture or stigma.

7 Limitations

The three main limitations identified were a small survey sample size, cultural aspects and stigma, and a small interview sample size.

7.1 Small Survey Sample Size

Our small survey sample size reflects time constraints, resource constraints and most importantly low response rate. Due to the in-person survey method, collecting data was time-consuming, and as this was completed over the University holidays group member availability was limited. The response rate was by far the most important determining factor to sample size, as it was very low at approximately

1/6. With a small sample size, the findings are generalised and lack broad applicability due to a limited representation of the target population of Ōtautahi businesses.

7.2 Cultural Aspects and Stigma

Reluctance and or disinterest from non-users may impact not only the understanding of the overall feasibility of cargo bikes but also the willingness to partake in the survey, ultimately impacting the sample size. The cultural factors influencing perceptions may not be appropriately captured in a small sample, resulting in limiting the depth of data analysis.

7.3 Small Interview Sample Size

The two reasons for a small sample size for interviews were time commitment and incomplete insights. Niche users may have limited availability, resulting in a smaller sample pool for in-depth interviews. Being that the interviews needed to be with business owners and not just employees. A small sample size can have bias and or identify the same barriers and benefits, this can fail to capture the full range of perspectives and experiences of cargo bike users.

8 Conclusion

Our research used a variety of data collection methods for users and non-users to examine the feasibility of cargo bikes in Ōtautahi and identify potential solutions to increase uptake. Qualitative interviews with current users revealed common themes about the social, environmental and efficiency benefits of cargo bikes. Furthermore, surveys and interviews provided insight into the perceived benefits and barriers associated with the adoption of cargo bikes. Addressing the barriers through potential solutions has the option to increase adoption and harness the potential of cargo bikes as a green transportation option.

Our research provides a starting point for understanding the viability of cargo bikes in an Ōtautahi business landscape. While the research was limited by a small sample size, it provides initial insights into the feasibility of cargo bikes in Ōtautahi. Further research with a larger survey and interview sample would provide more reliable results and there are clear opportunities for this research to build on these findings and use more representative samples. Doing so may provide greater reliability and depth of insight.

Overall, cargo bikes hold promise as a sustainable urban transportation solution. Utilizing targeted solutions to reduce barriers, an increase in cargo bike usage has the potential to contribute to delivery efficiency, emissions reductions, and increased social benefits for Ōtautahi businesses. Wider adoption will help create a bike-friendly culture and drive Ōtautahi towards its sustainability and transport goals.

9 Acknowledgements

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11 Appendix A

Questions
Can you briefly describe your business and how you use cargo bikes in your operations?
What, in your opinion, are the primary benefits of using cargo bikes for businesses, in terms of economic and environmental benefits
Have you encountered any specific challenges or barriers when using cargo bikes for your business? If so, could you please describe them?
Could you elaborate on how these barriers impact your business and your decision to continue using cargo bikes?
In your experience, do the benefits of using cargo bikes outweigh the barriers? Why or why not?
What do you believe are the key factors that could encourage more businesses to adopt cargo bikes as part of their operations?
Are there any specific strategies or initiatives that you think could effectively promote the adoption of cargo bikes among businesses?
Can you share any success stories or examples of how you have personally helped or witnessed other businesses increase their usage of cargo bikes?
From your perspective, what role do government policies or incentives play in promoting the use of cargo bikes among businesses? Are there any policy changes you would recommend?
In your opinion, how can cargo bike manufacturers or service providers better support businesses in integrating cargo bikes into their operations?
What additional insights or recommendations would you like to share with businesses considering the use of cargo bikes?
Is there any aspect of cargo bike usage for businesses that we haven't discussed but you believe is important to consider?
How do you see the future of cargo bike usage evolving within the business community? Are there any trends or developments you anticipate?
Have you needed to perform any maintenance or repairs for your cargo bikes, and if so were there any challenges associated with this?
Can you share any insights into the return on investment from using a cargo bike, or a comparison to other delivery methods you have used?
Have you previously used other transport methods for your business, and how would you compare your experience (the benefits and barriers) in comparison to using cargo bikes?
How does the weather impact the use of your cargo bikes? Do you use it during all seasons and temperature, as well as wet days?
How have you trained employees to use cargo bikes, and have there been any safety concerns or accidents with the use of them?
How would you describe the current state of infrastructure in your town or city for cargo bikes?
What are some key considerations when designing streets and infrastructure to accommodate cargo bikes effectively?
How would you describe the current car/cycle culture in your town or city, and how has it evolved over the years?