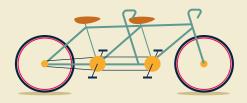
## Inclusive Bike Attachment

Presented by **ELMECHIO** Anastasia, Sean, Adriana and Sunwoo

# Summary of Key Components from Deliverables





### **Client Statements & Needs**

Client Statements	Interpreted needs	Priority
I want to remain in their own wheelchair	The Product directly connects bike and their wheelchair	5
I want to be comfortable	The user is not moving excessively in their seats	4
I want to have fun experience	The bike gives excitements to users	3
Van will be used to transport	The product is portable/light/easy to store	2

### **Client Statements & Needs**

Customer Statements	Interpreted Needs	Priority	
I want to have a fun experience	The bike gives excitement to users	3	
I want to be comfortable	The user is not moving excessively in their seats, and experiences little vibration	4	
Wheelchair is properly secured and safe	The connection from the bike to the wheelchair is strong	4	
	There is adequate connection between the bike and wheelchair to ensure the safety and stability of the biker and wheelchair user	5	
I want the inclusive bike to be fast	The inclusive bike enables fast biking speeds	3	

### **Client Statements & Needs**

I want to be at the front of the bike	Place the wheelchair in the front of the bike	4
I want to ride beside the river/bike path	Easy to attach/detach the devise	3
	Product will be able to withstand offtrack terrain such as: trails, biking paths, etc.	3
Not being used on sidewalks because they are bumpy	Product prevents "bumpy" feeling	4
Looks cool when I ride the bike and show it off to my friends	Product looks aesthetically pleasing	1
Van will be used to transport the bike/ will be stored in backyard shed	Product is portable, easy to store, and lightweight	2
Want to remain in their own wheelchair	The inclusive bike will not require the wheelchair user to leave their wheelchair	5
Use it to get place (as a mode of transportation)	Product will sustain long periods of usage and long distances	2
The biker should be at their leisure, do not want them doing additional work/intense exercise	Product enables leisurely experience for all participants	3
	Product eliminates difficulties of bike pushing an additional load (the wheelchair)	4
Some nervousness regarding speed, would like the ability to go fast but not always Table 2 Client Needs Statements	Product can achieve variable speeds both fast and slow	2

"We must design an attachment to secure a bike and wheelchair together, to allow the user of the wheelchair and biker to experience biking leisurely and safely"

### **Benchmarks**











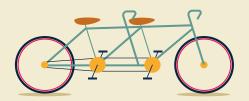
### Benchmark



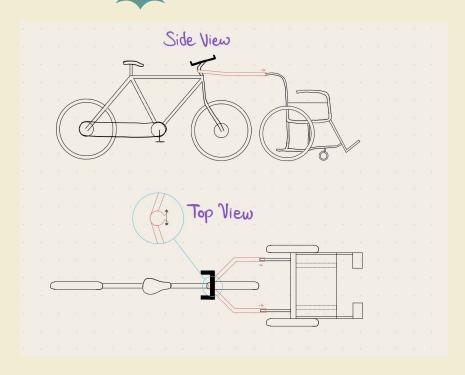
### **Target Specifications**

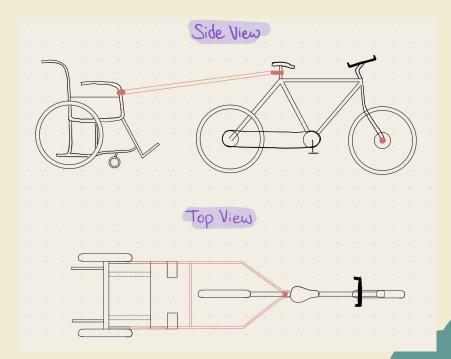
Metric	Marginal Value	Ideal Value	Unit	
Size	100-110 X 55-65 X 85-95	105 X 60 X 90	cm	
Cost	150-300	150	CAD	
Weight	15-20	15	LBS	
Lifespan	30+	30+	Years	
Speed	0-30	0-20	Km/h	
Material	Aluminum Frame, rubber tires	Aluminum frame/ acrylic frame, rubber tires	N/A	
Maximum Force	1000-1300	1300	N	

# Solution Options & Chosen Concept

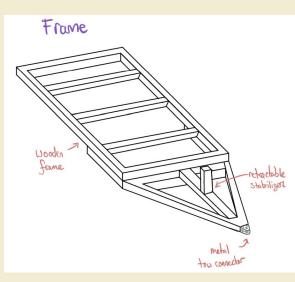


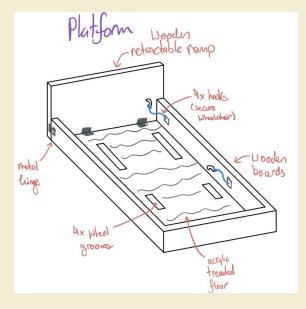
### **Solution Options**





### **Solution Options**





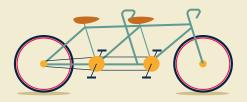


### **Decision Matrix**

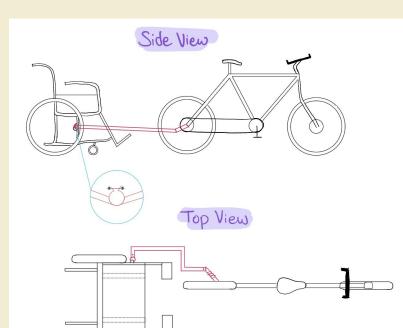
			27. Ve	8		I	I
Person	Concept 1 <ul> <li>Power     <pre>steering         would not         work connect         into their         preexisting         wheelchair</pre> </li> <li>Would be too         difficult to         take off the         front tires <ul> <li>Braking         issues due to         the lack of         front tire</li> </ul> </li> </ul>	Concept 2 • The levitating side piece would not distribute weight evenly	Concept 3 <ul> <li>Power steering would not work connect into their preexisting wheelchair</li> <li>Would be too difficult to take off the front tires</li> <li>Braking issues due to the lack of front tire</li> </ul>	Adriana	<ul> <li>Most feasible idea in terms of steering and holding the passenger</li> <li>Need to add hinges</li> <li>Axis of rotation is off with one tire</li> <li>Complex to create and expensive</li> <li>Most intricately thought out</li> <li>Breaking</li> </ul>	N/A Subsystem assessed as part of concept A	N/A Subsystem assessed as part of concept A
Anastasia	<ul> <li>The steering would not work but it works better than the other concept due to the struts</li> <li>The connection going through the wheel helps with steering</li> </ul>	<ul> <li>The axis of rotation would not transmit steering well</li> <li>Cannot push a connection</li> </ul>	<ul> <li>Steering may be heavy</li> <li>May block off the view</li> <li>Better steering</li> </ul>	Sunwoo	<ul> <li>lack of front tire</li> <li>Very secure with the screws</li> <li>Cost effective</li> <li>Lightweight</li> <li>Infront of the bike</li> </ul>	<ul> <li>Easy to steer</li> <li>Not where the client wants to be in terms of wheelchair placement</li> </ul>	<ul> <li>Easy to design</li> <li>Good view for client</li> <li>Use of platform means there is less use of wheelchair tires</li> </ul>



### **Chosen Solution**



### **Decisions Made**









# Decisions Made



### **Decisions Made**

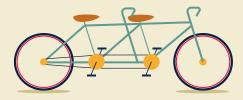


- Have the wheelchair be pulled, not pushed
- Have the product attach onto the wheelchair (via attachment points)
- The product to only attach to one side of the bike
- Material & Manufacturing Method (Steel & Welding)
- Attachment Methods (Clamp & Bike Attachment)



# Feasibility &

### **Business Aspect**



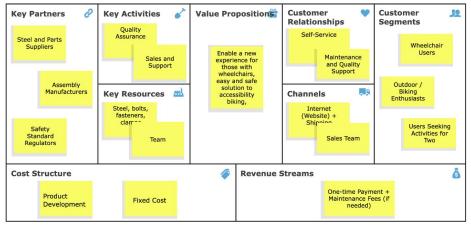
### **Feasibility Study**



- Analyze strengths and weaknesses
- Use of TELOS

### **Business Model & Economics**

#### Simple Business Model Canvas With Example



Designed by: Business Model Foundry AG

Sales			\$1 877 200
Cost of goods sold			\$1 251 466
Gross profit on sales			\$625 734
Operating expenses:			
	Delivery Fee	\$10 000	
	Marketing	\$15 000	
	Overhead	\$40 000	
	Rent	\$70 000	
Total operating expense		\$135 000	
Operating income			\$490 734
Net income			\$490 734

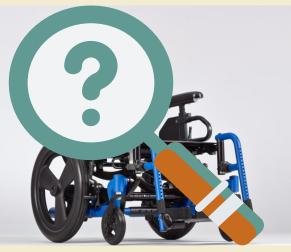


### Challenges & Lessons Learned



### Challenges





- Not being able to have their wheelchair with us when designing and testing
- Not knowing early what design we were going to stay with



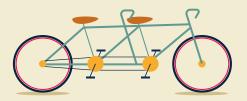
#### **Lessons Learned**

- - Time management- starting work in advance
    - Testing-make more prototypes



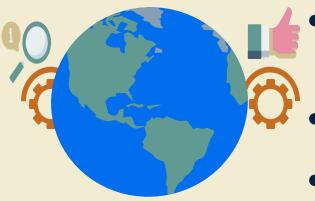


### **Future Work**



### **Future Work**





- Create low fidelity prototypes of wheelchair attachments
- Do testing with their wheelchair
- Attempt to build a more universal design

### Bibliography



Ki Mobility - FOCUSCR. (n.d.). Retrieved

December 4, 2022, from https://www.kimobility.com/WebS ite/Product.action?productName= Focus%2BCR

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