



# SCALABILITY STUDY

APPLIED DESIGN

Universidad Politécnica de Valencia  
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# SCALABILITY STUDY

## 1. PREVIOUS CONSIDERATIONS

The objective of the current study is estimate the average implementation cost of Chatterbox with a view to making it a scalable product. For them, two different scenarios are proposed. A Chatterbox implanted in cities at consumer level (100-1000 m<sup>2</sup>) and another thought for great productions (1000-10.000 m<sup>2</sup>). To scale Chatterbox all costs are measured per square meter.

Next we will analyze the costs of the structure, the fertigation system, the electronic components, the amount of substrate, monitoring system of the climatic and crop parameters and the system of air conditioning.

## 2. COST ESTIMATION

### 2.1 Structure

Consumer level	
Structure	Cost (€/m <sup>2</sup> )
Smoothing concrete floor	33.5
Metallic structure	7,7
Plastic coating (Opaque)	1,15
<b>Total cost (€/m<sup>2</sup>)</b>	<b>42,35</b>

Table 1. Structure: consumer level costs

Producer level	
Structure	Cost (€/m <sup>2</sup> )
Smoothing concrete floor	23.6
Metallic structure	12,68
Plastic coating (Opaque)	0,88
<b>Total cost (€/m<sup>2</sup>)</b>	<b>37,16</b>

Table 2. Structure: producer level costs

### 2.2 Fertigation system

Consumer Level	
Fertigation system	Cost (€/m <sup>2</sup> )
Irrigation head	1,36
Irrigation network	0.44

Phytosanitary treatment system	0,17
NFT system: PVC Channel	3,12
<b>Total cost (€/m<sup>2</sup>)</b>	<b>5,09</b>

Table 3. Fertigation system: consumer level costs

Producer level	
Fertigation system	Cost (€/m <sup>2</sup> )
Irrigation head	2,00
Irrigation network	0.44
Phytosanitary treatment system	0,17
NFT system: PVC Channel	3,12
<b>Total cost (€/m<sup>2</sup>)</b>	<b>5,73</b>

Table 4. Fertigation system: producer level costs

### 2.3 Electronic components

Consumer level	
Electronic components	Cost (€/m <sup>2</sup> )
Image recognition system: camera and others	0,782
Illumination	1.15
<b>Total cost (€/m<sup>2</sup>)</b>	<b>1.932</b>

Table 5. Electronic components: consumer level costs

Producer level	
Electronic components	Cost (€/m <sup>2</sup> )
Image recognition system: camera and others	0,782
Illumination	1.15
<b>Total cost (€/m<sup>2</sup>)</b>	<b>1.932</b>

Table 6. Electronic components: producer level costs

### 2.4 Substrate

Consumer level	
Substrate costs	Cost (€/m <sup>2</sup> )
Perlite	1,09
Coconut fiber	0,92
Rock wool	0,99

Table 7. Substrate: consumer level costs

Producer level	
Substrate costs	Cost (€/m <sup>2</sup> )
Perlite	0.99
Coconut fiber	0,867
Rock wool	0.90

Table 8. Substrate: producer level costs

## 2.5 Monitoring

Consumer level	
Monitoring	Cost (€/m <sup>2</sup> )
Sensors: temperature, oxygen, humidity, pH	0,11
<b>Total cost (€/m<sup>2</sup>)</b>	<b>0.11</b>

Table 9. Monitoring: consumer level costs

Producer level	
Monitoring	Cost (€/m <sup>2</sup> )
Sensors: temperature, oxygen, humidity, pH	0,145
<b>Total cost (€/m<sup>2</sup>)</b>	<b>0.145</b>

Table 10. Monitoring: producer level costs

## 2.6 Air conditioning

Consumer level	
Air-conditioning system	Cost (€/m <sup>2</sup> )
Heating	3,96
Low-pressure nebulization	0,92
<b>Total cost (€/m<sup>2</sup>)</b>	<b>4,88</b>

Table 11. Air conditioning: consumer level costs

Producer level	
Air-conditioning system	Cost (€/m <sup>2</sup> )
Heating	4,11
Low-pressure nebulization	1,67
<b>Total cost (€/m<sup>2</sup>)</b>	<b>5.78</b>

Table 12. Air conditioning: producer level costs

## 2.7 Total costs

Cost (€/m <sup>2</sup> )	Consumer level	Producer level
Estructure	42,35	37,16
Fertigation system	5,09	5,29
Electronic components	1.932	1.932
Substrate costs	1.09	0.99
Monitoring	0.11	0.145
Air-conditioning	4,88	5.78

Table 13. Total costs