

**EzUnlock:**

**The Door of the Future**

## **Table of Contents**

1. Executive Summary.....	2
2. Competition.....	3
3. Customers.....	4
4. Intellectual Property.....	5
5. Pricing.....	5
6. Distribution and Sales.....	6
7. Legal Requirements.....	9
8. Manufacturing.....	10
9. Testing and Quality Assurance.....	12
10. Design Essentials.....	13
11. Material Selection.....	14
12. The Actuator.....	14
13. The Servo Motor.....	15
14. The Deadbolt Lock.....	15
15. Appendix.....	16
16. References/Works Cited.....	18



### **Executive Summary:**

Our product, EzUnlock, presents the future of home technology for the newest phase of smart home integration going into the future. The main purpose of our product is to allow users to enter their home and have their door unlock and open automatically without the need to use a doorknob. This is accomplished by a sensor that detects the key on the user, and then automatically opens the door by using a motor, allowing our user a hands-free entry into their home and once they are inside, the door would close behind them and lock if that feature is enabled.

The target audience we are aiming for are the millennials and other generations that are already “smartifying” their homes with smart technology to add the next piece to their home. While this is a very new market, we are confident that our product will find its place within these communities and prove a worthwhile upgrade. Our other target audience is the elderly, disabled, or population that has difficulty entering and exiting their home with ease. Our product will provide these people with the autonomy to leave their home and allow them freedom and give them a better standard of living.

This product has very little competition as there are competitors that offer each service of either unlocking the door or opening, but there is no competitor that offers both to consumers. This allows us to be ahead of the curve. Many people have security systems that can lock their house all around but regarding the competition, our product is unique in which it does the functions of two separate products: unlock and open. All the current alternatives on the market do only one of the previously said functions.

The system works in a very simple way and is easy to install making it ideal for those who are interested in purchasing it. It is a quick add-on to the door, not a replacement, so in case an emergency occurs and a key is needed it will still work allowing users ease of mind and dispelling any worries they may be locked out.

## **Competition:**

EzUnlock is the door of the future. Many people are now “smartifying” their homes and one of the open spaces in the smart home improvement market is smart doors and locks. Many people have security systems that can lock their house all around but regarding the competition, our product is unique in which it does the functions of two separate products: unlock and open. All the current alternatives on the market do only one of the previously said functions.

Currently the main keyless entry systems with whom we would have to compete with are keypad numeric entry systems, fingerprint entry systems, and smartphone based entry systems. The first we would have to look at is the keypad entry, an example of this would be the Schlage Camelot Keypad Entry with Flexlock<sup>18</sup>. This system has a simple 0-9 digit keypad and lever to open the door once access has been granted and has key entry in case the battery runs out. The issue with this door is that it doesn't get rid of the need to go up to the door problem. If your hands are full you still have to put everything down to type in the keycode and while you don't need to fumble around to find your key it doesn't resolve the problem entirely.

The next system we would have to compete with would be the fingerprint entry: Ultraloq Fingerprint and Touchscreen Keyless Lock<sup>19</sup>. This uses biometric information (fingerprints) to unlock the door and is capable of programming up to 99 different access codes and 99 different fingerprints. The security behind this is good but as seen in movies it is not that difficult to clone fingerprints so in some cases it might not be that secure if someone is really trying to break into your house. The issue with this is also that you would have to get one of your hands free in order to open the door.

The last product is the closest to the concept we envisioned, the Kwikset Kevo smart home entry system<sup>20</sup>. The Kevo works through a phone app which detects your location and when within a certain proximity of the door, all you do is touch the Kevo to unlock the door. The Kevo can detect when you are inside or outside the house and uses a military grade PKI encryption in order to be secure. This is the closest conceptually to the unlocking mechanism we have created but the one main difference that puts our product over the top is the automatic door opening system which will take away the need from touching your door at all.

The automatic door opening market is a lot smaller than the unlocking market. The Automatic Swing Door Opener with Wireless Push Button (from amazon)<sup>4</sup> is designed to open doors in a house for disabled users at the push of a button. This is more designed for interiors of the home and not exteriors so it works similarly to what we want but only does half the work.

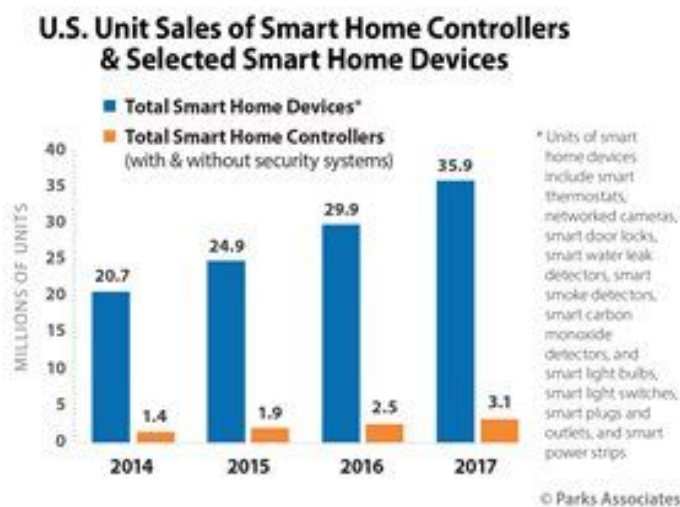
The main thing all these products have in common is that they are mostly super pricey. The ones that do the least work cost in the \$200 range and the most expensive parts can range up to \$500. The Kevo is the cheapest and most similar product so that would be our greatest competition. The main thing that consumers would value about our product compared to the Kevo is that ours would open the door making their lives easier.

The products that were seen all are distributed online on Amazon or in hardware stores such as Home Depot or Lowes. This would be the ideal place for us to sell our product because people would have the option to see our product in store before they purchase and this would allow them to see how ours is the most unique one. Selling to such companies allows our product to be marketed directly to our target market group because they will already be going to door manufacturing companies or home improvement stores looking for similar products.

## Customers:

The customer base we are targeting is people who are elderly or disabled. Our product makes it easier for such individuals to enter their homes because it would remove the difficulty of having to use a key to unlock a door. Some of the main buyers of home improvement amenities are baby boomers, as this population ages, they will have more need for our product.

While this product is geared for the elderly or disabled, it is also a great product for people who are looking to begin or further automate their home. It will spike the interest of people who are looking to remodel their home and make it more technologically advanced.



According to the graph from CEA and Parks Associates<sup>22</sup>, the smart home market has been rapidly increasing for the past few years. While this data is a little older and very generalized it still shows that people are more and more interested in smartifying their homes and as we push to a more technologically advanced era with everything being automated, that will become the future of our homes.

The group of people most likely to buy our products are those who are elderly and/or disabled or those just looking to renovate their homes and make it more technologically advanced. It is important to target the aging baby boomer population, they are in most need of our product and most likely to add renovations to their homes. We could also have home renovation businesses endorse our product or advertise it.

## Intellectual Property:

Before we can be fully confident with our design, we must take a look at the products that were created before ours and examine the patents behind them. In doing so, we ensure that our product has no legality issues and can establish a patent of its own. In terms of our electronic smart door, we took a look at key aspects of the door, the RFID (radio-frequency identification) chip and the design of the system itself.

Taking a look at the patents available online, several ideas and concepts like mobile unlock/lock systems<sup>9</sup>, position sensing devices<sup>7</sup>, tapping/touch input devices<sup>16</sup>, and lock system/door bell combinations<sup>12</sup> dominate the market. This wide variety of lock systems puts a bit of strain on the concepts that we can implement, however, our idea of implementing the RFID chip based on distance is still intellectually safe.

The topic of most concern are the position devices, however, the only patents active deal with position in terms of mobile devices. Companies like UniKey<sup>17</sup> and Kwikset have patents on mobile devices that require a certain distance to unlock the door system. In our case, we also implement distance as a key factor but our usage of distance in terms of RFID keeps our idea original.

Mentioned earlier, competitors like Kevo and Ultraloq<sup>16</sup> have already implemented ideas of the smart lock system. This competition will be tough, because of their experience and knowledge in the industry, but they don't necessarily have a strong grasp on the market. Each company in this "smart lock" industry has good representation but there is no clear cut winner, thus giving us a great opportunity to introduce our own smart lock system, "EzUnlock", the door of the future.

Our "EzUnlock" system is unique in that it simplifies the door opening system and caters to a wider audience than the other products. Our usage of RFID chips allows for distance to be the key factor in our system and ignores the hassle of mobile phone apps, touch lock systems, and fingerprint scanners, while still providing the same amount of security. Our system makes use of the "unlock and open" concept and is a big separator from the products before us.

### **Pricing:**

**Ballpark estimations of the pricings of each piece of our product (from amazon.com):**

<b>Products(materials)</b>	<b>Price (in \$)</b>
12" Force 300N Linear Actuator Motor <sup>5</sup>	60
RFID wristbands <sup>14</sup>	15
RFID scanner <sup>8</sup>	5

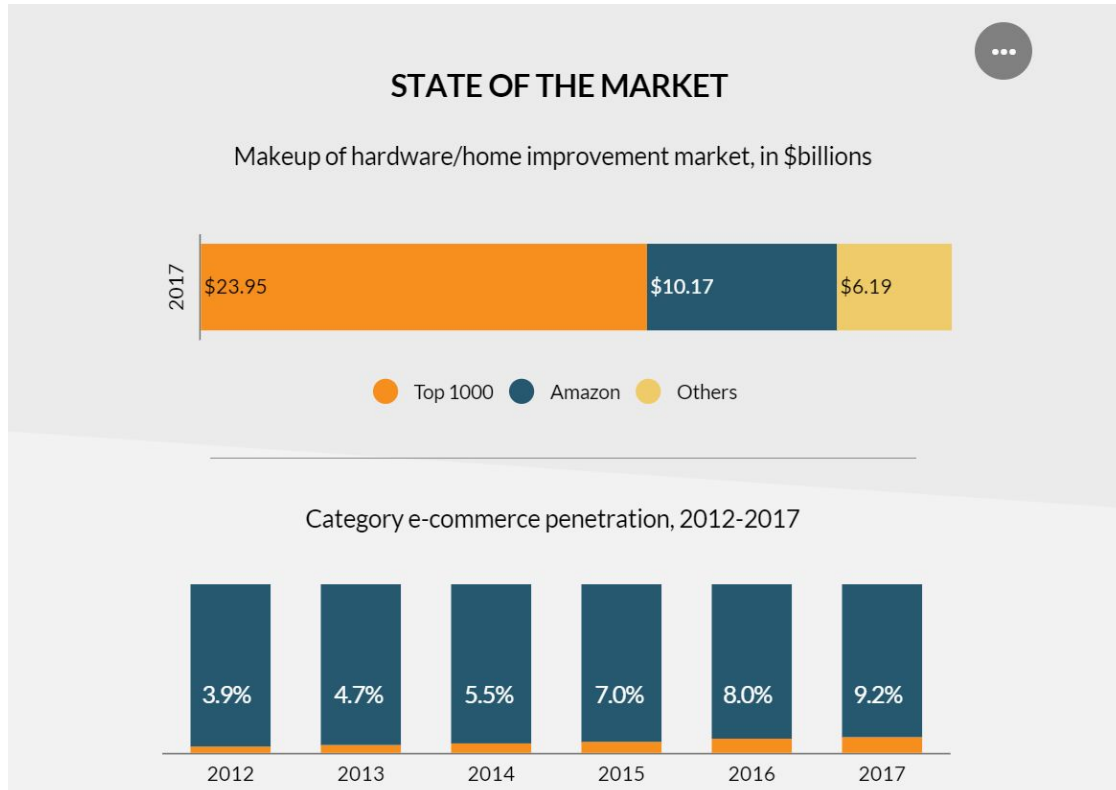
Servo motor for lock <sup>3</sup>	15
Strong deadbolt lock <sup>11</sup>	50

Given that the prices above are from Amazon, and are products that have already been designed, assembled, and packaged, one can assume they are a solid representation of how much these products each cost including design, assembly, and packaging costs, plus a significant markup. Thus, it can be assumed that the price to build one of our devices will fall at around \$150. We will markup the price at least 125%, resulting in a point of sale price tag of around \$350. We believe that customers will certainly be willing to pay this price for our product. It is one-of-a-kind in its myriad functionality (unlike our competitors who either have doors which just automatically open, or electronically unlock, ours does both), and the vast majority of those in our target demographic will not have the technological know-how, nor the time, nor the determination to figure out how to rig up this kind of system on their own.

The closest price tags to our product that can be found on the internet are those of the aforementioned two products that compete with us: electronic locks, and automatically opening doors. The electronic locks vary in both functionality and price point. The first competitor we researched was the Schlage Camelot lock. It is a pretty basic electronic lock, with a keypad and a physical key in case the lock runs out of battery. On amazon, Schlage Camelots run for about **100-200 dollars**<sup>15</sup>, depending on the material and if you want to add on alarm capability. Our second researched competitor was the Ultraloq fingerprint and touchscreen keyless lock. As the name suggests, the Ultraloq uses fingerprints and a keypad to allow you to choose between biometric scanning or a pin to unlock your door. You can program in up to 99 different functional fingerprints and up to 99 different functional pin codes. On amazon, the Ultraloq is priced at **150 dollars**<sup>16</sup>.

### **Distribution and Sales:**

The main method of distribution of our product to consumers will be through our own online shop, through major DIY and home improvement retailers, and also through major online retailers. Since the online market for home improvement is increasing at a large rate, estimated 23% increase from the year before<sup>1</sup> (graph 1), the initial stages will focus on physical retailers and then shift to online retailers in order to maximize on the ever-growing E-retailer markets.

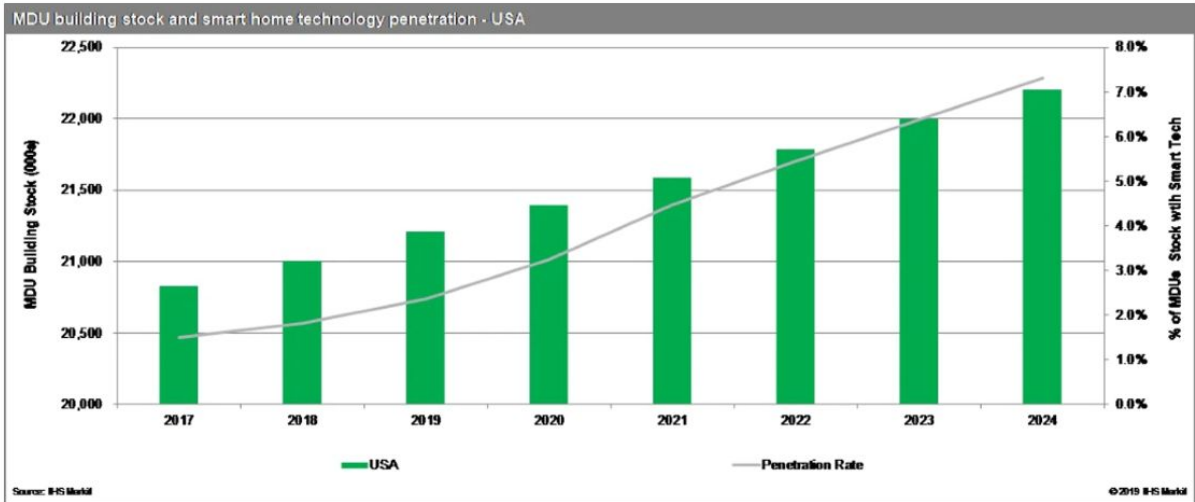


*(graph 1: Source: Internet Retailer estimates. U.S. Commerce Department)*

The companies that we aim to work with are large door and entrance manufacturing companies and home improvement retailers. For door manufacturers, we aim to integrate our product as the ultimate package for consumer-level doors, and be marketed along with other door products. The large door manufacturing companies would be Andersen Windows, Pella, and JELD-WEN and our product will be sold alongside their doors as an upgrade, providing a beneficial relationship if they agree with us. For the physical retailers, the large businesses are Home Depot, Lowes, and Ace Hardware within the continental United States. These corporations would allow us to sell our product within their retailers, as well as provide installation services to make our product more approachable to a novice installer or to someone who does not have the capability to install it themselves.

In order to enter our products into these corporations product lines, we will need to apply for a supplier application and become approved<sup>6</sup>. This will be marketed by emphasis on the growing smart home market, which is what our target market is. The growing market of smart homes(graph 2) , as well as its application to disabled and elderly people will allow these retailers to enter a growing market, and thus prove beneficial to both and allow us to sell our products within their stores.

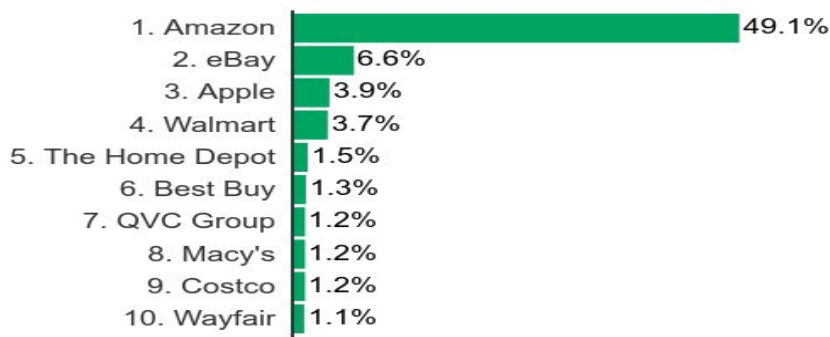




Graph 2: Growth of Smart Home market

To enter the online market for our products, we can begin selling on eBay and Amazon. On eBay, a store page would be created in order to sell directly to our consumers.. The pros of selling on eBay is that there is less competition and the advertising on eBay is cheaper when compared to Amazon. The biggest factor for choosing eBay over Amazon would be that overall, eBay has less seller’s fees, which on average results in about 2-3% greater profit than Amazon. When looking at Amazon, the benefits that Amazon provides is that Amazon has a far greater unique site visitors globally, almost twice as large as eBay<sup>13</sup>. The other large benefit that Amazon provides is that Amazon has a far greater market population in the United States<sup>10</sup> compared to eBay as seen in the chart below(graph 3). See the appendix for some more graphics comparing amazon and ebay.

**Top 10 U.S. companies based on % of e-commerce sales**



Graph 3: Top 10 U.S.A. companies based on E-commerce sales

Source: eMarketer, July 2018



So when comparing the both markets for an online market, the greater focus should be on Amazon in order to maximize our sales in the United States Domestic

market. The process for signing up to become a seller will each be required to apply to sell on each website<sup>4</sup> and pay their respective fee in order to sell, leading to an cost effective way to enter the market, and then shipping will be handled through the methods that each website recommends, which will be through UPS and the shipping costs will be paid through that.

To summarize the method of distributions, our products will be advertised as upgrades to existing systems by being placed near other smart home amenities, entrances to doorways, and being showcased at shows involving smart home products. It will also be showcased alongside products that will help the elderly and disables gain more independence. This will allow larger companies to enter a growing market if they decide to work alongside us, and distribute our products to our consumers, as well directly selling to consumers at showcases and through our own methods.

### **Legal Requirements:**

There are myriad regulations and legal specifications for the installation of doors, the vast majority of which stem from the ADA, the Americans with Disabilities Act, which was put into place in 1992 to help increase national accessibility of public spaces to individuals suffering from disabilities. The key word there is public spaces; doors in private homes can be in pretty much any size or shape, with the doorknob located at any height, and so on. However, to ensure that our product is able to be sold to public spaces as well, we have studied and come to understand the ADA regulations for doors, specifically door-opening and -closing mechanisms. Since we are not responsible for the actual door itself that the customer chose to install and only for the functionality and compliance of the parts we provide for them, the sections solely regarding *door* installation regulations are rendered mostly irrelevant to our research (a graphic of proper door outlining by the ADA is included in the appendix, however.)

The first regulation that concerns our product is handle regulations. The general rule for this, from the ADA, is that a handle or opening mechanism cannot require tight grasping, pinching, or wrist-twisting to function. Our product handily complies to this by the fact that all one must do to activate door-opening action is be within a specified distance from the door. No touching of the door is required, much the less grasping, pinching, or twisting.

The second regulation that concerns our product is the opening-hardware height regulation. The ADA<sup>2</sup> states that any hardware for closing can not be mounted at more than 48 inches above the floor. It is assumed that this really is in reference to handles and other opening mechanisms which require physical interaction, but just to be sure this is included in the list of regulations with which we will make sure our product complies.. Our lock and actuator will be flexible to what height they are mounted on, but with the instructions we will elect to include a warning that if installed more than 4 feet above the ground, your door and opener will be rendered non-compliant with ADA regulations.

As for the actual action of opening and closing the door, there are a few regulations that our product must comply with.

1. A door closer must take at least 3 seconds to open and at three inches from the latch to close the door
2. A door must take no more than 5 pounds of force to open
3. A door cannot require more than 15 pounds of force to stop door movement

The first one we will simply program into our device. Since our device is an automatic door opener using an actuator, the customer will actually have to use a sum zero pounds of force to open the door. We will make sure our actuator is applying less than 15 pounds of force to the door in opening and closing action so that anyone who needs to stop the door can overpower the actuator if need be, thus making it compliant.

### **Manufacturing:**

For our EzUnlock Door System, we will manufacture the product in a series of steps. We will first contact manufacturing companies in order to gain the material to assemble the different components we need, these components being the RFID wristbands, RFID scanner, linear actuator motor, servo motor for lock, and the strong deadbolt lock. The processes used for these components of our system include welding, machining, and soldering.

<b>Products(materials)</b>	<b>Price (in \$)</b>
12" Force 300N Linear Actuator Motor <sup>5</sup>	60
RFID wristbands <sup>14</sup>	15
RFID scanner <sup>8</sup>	5
Servo motor for lock <sup>3</sup>	15
Strong deadbolt lock <sup>11</sup>	50

(Taken from market research section of our project)

For the linear actuator motor, we will look to get in good relations with companies that can supply us with the linear actuator motor at a good price and build a strong relationship with that company over the years. As for the wristbands and scanners, we will look to purchase key components of these items (parts and materials). We will have a production factory in which these materials will be assembled to create the final product (wristband/scanners). This assembly line will most likely be manufactured domestically (California) initially, in order to ensure that the process is efficient and running smoothly. Once the production and flow of material to item is consistent, we will look to expand our horizons to areas such as China and other states such as Illinois and Minnesota. Our reasoning for this is due to the fact that these states have less residential areas and smaller populations, thus the cost of land will be more affordable, whereas in the case of China, the labor tends to be cheaper.

As for the servo motor and strong deadbolt lock, we will look to see if an existing company already produces these items, or if not, they are able to do so with the parameters that we desire. If not, we will look to procure the materials for these components of the lock system and assemble them ourselves in our factories. Overall, we will first look to existing companies to see if they can produce our components for us at a reasonable price, however if they can't or will not, we will look to purchase the materials for the components and implement our production factory to assemble the materials there.

### **Testing and Quality Assurance:**

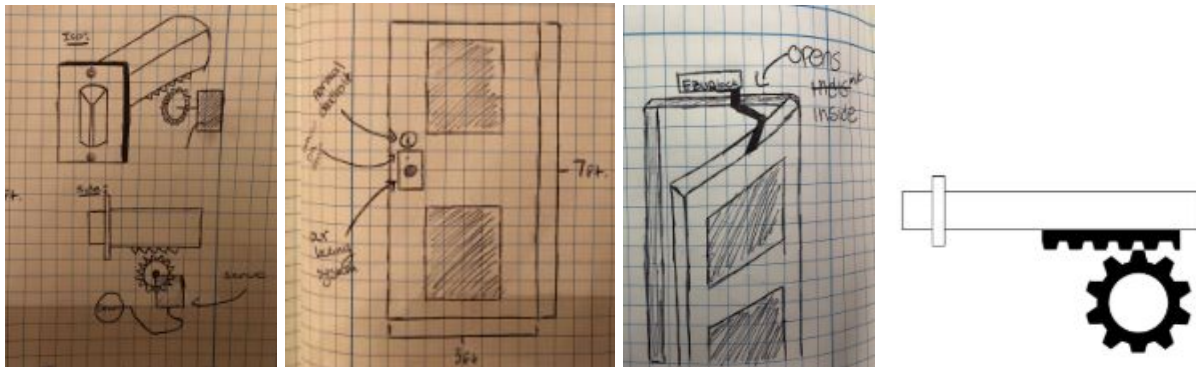
To begin testing to see if our product works as efficiently as possible, a preliminary trial would begin in the factory by setting up a standard sized doorway hooked up to our mechanism

to ensure that our product provides enough force to open a standard exterior door as defined by the ADA requirements of automatic doors, which is no more than 5-10lbs of force<sup>1</sup>. Once an adequate force has been discovered, then the testing goes onto phase two, which is ensuring that the door automatically opens once its appropriate RFID chip is within range, and then calibrating the door so that the base range of the RFID chip is within an acceptable distance, (Likely to be less than 5 feet from the door). This distance will be defined by the will not automatically opened when it is unwanted, however in the end product, the range can be customizable to best fit the individual needs of the user. Then, the next phase of the RFID chip testing would begin by ensuring that each chip can only open its unique door and it cannot be used to open other doors, or be easily hacked to prevent unwanted visitors from entering the home. This can be accomplished by having each chip have a unique signature on multiple frequencies. This is done in order to create a multi-level protection to prevent someone from accessing each frequency at once<sup>2</sup>. For in-factory testing, the system will be tested consecutive times in a row to ensure that there is no failure with repeated opening and closing and that it is able to operate safely and minimize the amount of stress that goes into both the door and the mechanism.

To ensure its quality, every mechanism will go through a base inspection before getting boxed and packaged, as well as every 100 units (number will vary based on the volume of products sold) to ensure that products are being sold are held to the regular standard. As well as the inspection, once sold, each product will come with a two year warranty, like many competitors offer<sup>3</sup>, to ensure our market will be able to use and replace their product should a malfunction occur. Should a malfunction occur, while the unit is inoperable, there will still be a traditional lock and key system in place in order to ensure that the customer can still access their home, no matter what the situation is. Thus to ensure a safe product that will be able to fit the

needs of our target market, these methods and tests will be in place to ensure the highest quality product is able to reach our customers.

## Design Essentials



This product works through two different main mechanics. The first part of the product is the door's locking and unlocking mechanism. This mechanism is similar to a deadbolt connected to multiple motors. The first part would have to use the RFID sensor near the door and activate the motors. When the motors activate the gears as seen in the drawing would pull the deadbolt back unlocking the door. This would allow the door to be opened easily with a push but our product tries to eliminate all need for contact with the door. Once the door unlocks there will be a linear actuator at the top of the door which will be in charge of opening and closing the door. A separate motor will function to control this actuator and make it so that the door opens upon entrance of the building and will close after a time lapse in order to make sure the door closes again and then it will relock itself. This will make it so there are no issues regarding security. The key to making sure the code is unique would work similarly to a garage door scanner which rolls through multiple codes in order to ensure security

The customer will use this by buying our product from a store such as Home Depot or Lowes and installing it themselves. The process is simple as all you will need to do is replace the

currently existing locks in the door you own now with the new locks, and install the actuator on the top of the door. The product will be battery operated so there are no complex electrical components needed and a simple solution for consumers. In case the batteries die, the product is not designed to replace the current system but improve upon the currently existing components so a key can still be used to enter the door in cases of energy absence.

## **Material Selection**

Given that our product is not actually one item but a collection of parts, installed in different places in the door, working together to accomplish one task, we will need to research and detail the materials that go into each part separately. The main method used here for trying to get a good idea of what materials go into each of these parts is looking at other models designed by established manufacturers and getting an idea of the different material options that they employ and the reasoning behind their choices.

Here is the part-by-part guide we have compiled looking at common material choices for each of the pieces of our product:

### **The Actuator:**

The actuator is an extremely important part of the product; it is also the most mechanical piece, and thus the material we choose to employ here is crucial to the functionality of our entire product.

The vast majority of door opening actuators we could find listed for sale were cast iron with aluminum finish. For example, the [Lawrence LH8016 Extra Heavy Duty Opener](#) is a very popular commercial door opener which is a proponent of this material layout. In the advertising for the LH8016, they cite its “wrought iron steel” as the basis for the product being “strong but silent” with “smooth operation”. If we went with cast iron for the door opening mechanism, we would not only be benefiting from using a tried-and-true material, popular among established manufacturers of this type of product, we would also be able to use a similar marketing strategy, which uses the cultural understanding of iron as a strong, unwavering metal to make it clear to our customers that our product is similarly solid and reliable.

### **The Servo Motor:**

Another highly mechanical part of our product, the servo motor is the small motor system which will rotate to engage and disengage the door lock in the process of opening and closing. Presumably for this type of mechanism we would be looking for metals which are commonly used for motors and other electrical/mechanical systems, namely the metals employed in the design of popular small-scale servo motors.

The majority of small servo motors use a combination of copper and aluminum gears. The [ANNIMOS High-Torque Digital Servo Motor](#) is a popular servo motor which does so, for example. It also uses an aluminum shell, and as the shell protects the mechanisms of the motor we should definitely make sure we are using the right metal. Aluminum is the cheapest metal, so if we used aluminum and copper gears with an aluminum shell it would definitely help to get manufacturing/material prices down.

### **The Deadbolt Lock:**

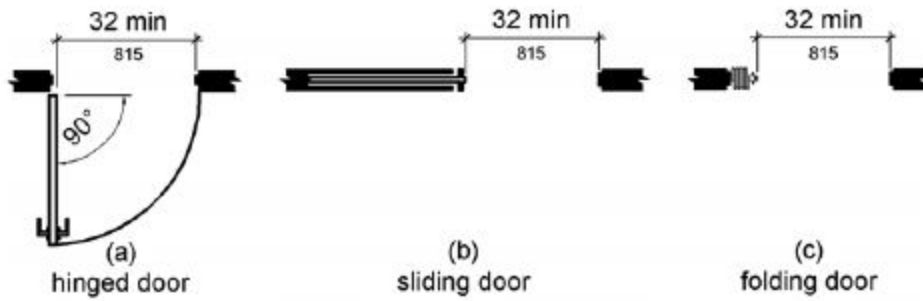
The metal for the deadbolt lock isn't really a question. Pretty much every deadbolt uses steel, an incredibly strong metal for the part of the door that needs to be the strongest. A deadbolt is meant to be able to withstand a lot of force and only with prime metal can it do so. For example, the [Pacific Doorware Storefront deadbolt lock](#) uses "huge five-ply laminated steel bolt with a concealed hardened steel to provide maximum security." All steel.

## **Appendix**

In this appendix there are a few good graphics/comparison charts that we used in researching this project that were deemed non essential to the final product.

The general outline of an ADA-compliant door that makes room for all standard wheelchairs:





Some more comparisons between amazon and eBay, from wheretosellonline.com

**Which site offers more seller tools?**

Seller Tools		
	eBay	Amazon
Social Media Tools	no	no
Shop Analytics	yes*	no
Seller Success Resources	yes	no
Mobile Readiness	yes	yes



**Which site has more shoppers?**

Site Traffic		
	eBay	Amazon
Alexa Rank (US)	7	3
Bounce Rate	20.4%	22.5%
Time Spent on Site	12:10	11:23
Countries Available	36	10

**Which site offers the best**

**profit margin?**

Example 1: Books		
Sale Price	\$30.00	
	 eBay	 Amazon
Final Value Fee	\$3.40	\$4.50
Closing Fee	\$0.00	\$1.35
Listing Fee	\$0.30	\$0.99
Paypal Fee	\$1.17	\$0.00
Total Fees	\$4.87	\$6.84
Total Profit	\$25.13	\$23.16
Profit Margin	83.77%	77.20%

Example 2: DVDs		
Sale Price	\$15.00	
	 eBay	 Amazon
Final Value Fee	\$2.12	\$2.25
Closing Fee	\$0.00	\$1.35
Listing Fee	\$0.30	\$0.99
Paypal Fee	\$0.75	\$0.00
Total Fees	\$3.16	\$4.59
Total Profit	\$11.85	\$10.41
Profit Margin	78.97%	69.40%

Example 3: Watches		
Sale Price	\$250.00	
	 eBay	 Amazon
Final Value Fee	\$25.75	\$37.50
Closing Fee	\$0.00	\$0.75
Listing Fee	\$0.30	\$0.99
Paypal Fee	\$7.55	\$0.00
Total Fees	\$33.60	\$39.24
Total Profit	\$216.40	\$210.76
Profit Margin	86.56%	84.30%

## References

1. Ali, Fareeha. "Market Overview: Online Hardware and Home Improvement Sales Grow 23%." *Digital Commerce 360*, 30 Oct. 2018, [www.digitalcommerce360.com/2018/10/30/online-hardware-home-improvement-market-overview/](http://www.digitalcommerce360.com/2018/10/30/online-hardware-home-improvement-market-overview/).
2. Alyson, Jennifer. "ADA Door Regulations." Small Business - Chron.com, <http://smallbusiness.chron.com/ada-door-regulations-42318.html>. Accessed 18 February 2020.
3. ANNIMOS, "20KG Digital Servo High Torque Full Metal Gear." United States of America, 2017
4. Amazon Inc. "GP." *Amazon*, Goettsche Partners, 2011, [sellercentral.amazon.com/gp/help/external/201021820](http://sellercentral.amazon.com/gp/help/external/201021820).
5. Amazon Inc. "." *Amazon*, Goettsche Partners, 2011,
6. Autoslide. "Warranty." *Autoslide Automatic Sliding Doors*, [autoslide.com/terms-of-service/warranty/](http://autoslide.com/terms-of-service/warranty/).
7. BEMONOC . "12" Force 300N Linear Actuator Motor. " United States of America. 2016
8. Brogie, Frank. "How to Sell to Home Depot." *Repsly*, 2019, [www.repsly.com/blog/consumer-goods/how-to-sell-to-home-depot](http://www.repsly.com/blog/consumer-goods/how-to-sell-to-home-depot).
9. Cheng, Shih Yu Thomas, et al. *Intelligent Door Lock System*. 26 Apr. 2016.
10. Dumas Philip C., Thomas A. Bennett, Justin Handville. *Wireless access control system and related methods*. 15 Aug. 2015
11. FTCBlock. "RFID Kit." United States of America. 2018
12. Ku, Che-Ming. *Control Method for Smart Lock, a Smart Lock, and a Lock System*. 18 Aug. 2016.
13. Kwikset "KEVO Pro" CO. 2019 Spectrum <https://www.kwikset.com/kevo/smart-lock>
14. Lunden, Ingrid. "Amazon's Share of the US e-Commerce Market Is Now 49%, or 5% of All Retail Spend." *TechCrunch*, TechCrunch, 13 July 2018, [techcrunch.com/2018/07/13/amazons-share-of-the-us-e-commerce-market-is-now-49-or-5-of-all-retail-spend/](http://techcrunch.com/2018/07/13/amazons-share-of-the-us-e-commerce-market-is-now-49-or-5-of-all-retail-spend/).
15. "Opening Doors To Everyone." *ADA National Network*, 4 Mar. 2020, [adata.org/factsheet/opening-doors-everyone](http://adata.org/factsheet/opening-doors-everyone).
16. Pacific Doorware, "Storefront Door Mortise Lock Swing Deadbolt & Cylinder Combo." Battleground, WA. 2017

17. Park and Associates. “Parks Associates Whitepaper Examines Role of Smart Home in the Future of Telecare and Independent Living” Aug. 2019  
<https://www.parksassociates.com/blog/article/pr-08082019>
18. PDI, Name. “5 Myths About RFID Chips.” *PDI*, 3 Oct. 2017,  
[www.pdiscan.com/5-myths-about-rfid-chips/](http://www.pdiscan.com/5-myths-about-rfid-chips/).
19. Scalisi, Joseph Frank. *Smart Lock Systems and Methods*. 2 Feb. 2015.
20. Schlage. “Touch Camelot Deadbolt.” Colorado Springs, CO. 2014
21. Schlage. “Compare.” Colorado Springs, CO. 2014  
<https://www.schlage.com/en/home/smart-locks.html>
22. Ultraloq. “UL3 Fingerprint and Touchscreen Keyless Smart Lever Door Lock.” Fremont, CA. 2017
23. Ultraloq. “SMART LOCK.” CO. 2019 <https://www.u-tec.com/lock/compare.html>
24. Wheretosellonline Organization. *Where to Sell Online*, 2018,  
[www.wheretosellonline.com/amazon-vs-ebay/](http://www.wheretosellonline.com/amazon-vs-ebay/).
25. YARONG TECHNOLOGY CO.,LTD. “RFID Rewritable T5577 125khz Writable Silicone Wristband.” FuJian, China. 2006
26. <https://www.amazon.com/Automatic-Swing-Opener-Wireless-Button/dp/B01AG2C7KM>