IRBT Investment Thesis: iRobot's Stock Will Return to Growth in 2018 as Critics Realize that iRobot's Market Position is Firmly in Place in the Robotic Vacuum Cleaner Market

Investment Thesis: Conclusive evidence indicates the recent sell-off presents a major buying opportunity for informed investor who understand the true economics of the RVC industry, globally and domestically. After several earnings beat and raises, the stock broke its long-term ceiling of $35, and rose ~175% between 2016 and mid-2017. This positive sentiment showed signs of weakness in mid-June 2017 when a negative report was published citing speculated slower growth. However, this reversed immediately when the company reported a very strong quarter in July 2017.

The positive trend reversed again when a relatively unknown investor published a critical report that highlighted the expectation of a material decline in the stock. The cornerstone of the negative report was the conviction that the entrance of SharkNinja (Shark) in the robotic vacuum cleaner space would materially impair iRobot's revenue growth trajectory. This caused the stock to immediately fall almost -15% and has continued to trend negatively since this report was published even after very strong Q3 and Q4 2017 reports. An intensive analysis of the underlying variables clearly indicates that iRobot is firmly secure as the leader of this emerging industry. After conducting deep research on current microeconomic dynamics, we find it almost laughable that critics are so convinced that Shark is a major threat.

The RVC Market is at the Beginning of a Major Inflection that Will Primarily Benefit iRobot

iRobot is at the forefront of a high-growth (global market share of 62%), disruptive industry that is still in the early stages of growth. Robotic vacuum cleaners are only beginning to penetrate the $7bln premium (above $200) vacuum cleaning market. iRobot's internal market analysis indicates that only 10% of domestic households have been penetrated, which equates to about 12mm households. More importantly, the analysis also indicates that the next segment of the market is an incremental 27mm households. The continued adoption of this technology is expected to increase the size of the global RVC market at a CAGR of 15% through 2021, according to analysis done by iRobot and industry consultants.

iRobot will Continue Dominating the Competition Based on Their Compelling Offerings

iRobot has several competitive advantages that drive revenue growth and secure market share. The company has a clear leadership position in the premium ($200 and above) segment of the market based on much more sophisticated technology (over 1,000 global patents), developed over decades, that supports a broad product assortment. The company employs a "good, better, and best" approach to product assortment. iRobot leverages the feedback received from over 10 million Roomba customers to allocate their $100mm annual R&D spend to develop differentiated functionality and features.

While the vocal critics of iRobot believe the entrance of Shark into the RVC space will present iRobot with "much needed" competition, they neglect the fact that iRobot has already defeated many new entrants in 2015 and 2016. Shark officially launched their RVC in mid-September 2017 and we have found the strategy to be highly flawed. While Shark has developed an inferior iRobot knockoff, the product is far less sophisticated yet the price is actually more expensive than the popular 600 series of Roomba.

iRobot has Significant Upside in their International and Wet Floor Care Businesses

In addition to the momentum in the core RVC domestic business, iRobot has considerable opportunities for growth in their international business. Historically, the international business has generated considerably more revenues than the domestic business. Management has started to take control over their international businesses to push penetration further. In addition to the core RVC product, iRobot has a major growth opportunity in the wet floor care (WFC) space. Customers were immediately receptive of the Braava jet, which droves sales growth over 75% in 2016 despite being internationally introduced later in the year. This growth has continued in 2017 with Braava revenues increasing 26% in 2017.

Catalyst: Based on the information gathered, the next couple of earnings calls are the likely catalysts.

Investment Risks: Continued negative sentiment or weakness in the international business.

iRobot
(NASDAQ: IRBT)

Price:	$66.43
Target Price (CY19):	$117.00
Target Increase:	76%
Cons. Target Price:	$73.43
Cons. Target Increase:	10%

Company Statistics

Market Cap:	$1.86bln
Enterprise Value:	$1.55bln
Net Debt:	-$310mm

Share Statistics

Shares Outstanding:	28mm
Free Float:	27mm
Short Interest:	39%
52wk Range:	$51.8-$109.7

Buys	1
Holds:	6
Sells:	1

Revenue Breakdown

U.S:	52%
EMEA:	33%
Japan:	12%
China:	3%
Robotic Vacuum:	91%
Robotic Mop:	9%

As of 3/3/2018

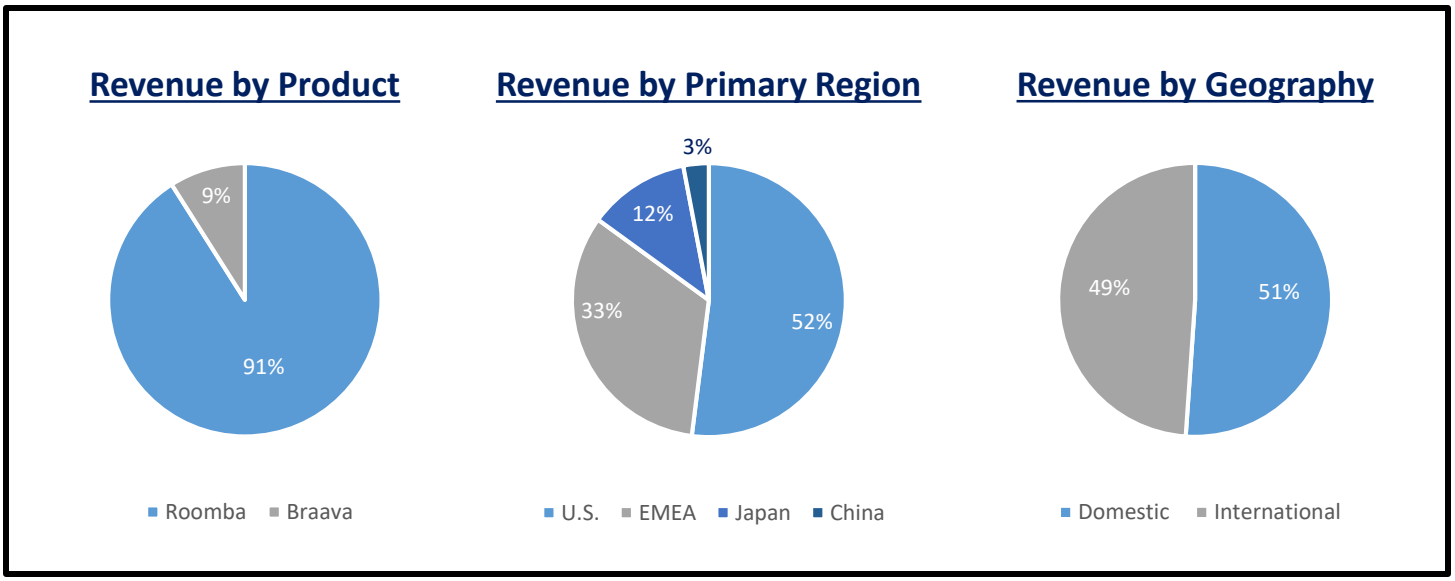
$'s in millions	2017A	Q1 2018E	Q2 2018E	Q3 2018E	Q4 2018E	2018E	2019E
Revenue	**$ 883.9**	**$ 222.3**	**$ 234.0**	**$ 269.1**	**$ 444.6**	**$ 1,170.0**	**$ 1,427.4**
Growth	*33.8%*	*32.3%*	*27.9%*	*31.3%*	*36.0%*	*32.4%*	*22.0%*
Gross Profit	**433.0**	**108.9**	**114.7**	**131.9**	**217.9**	**493.9**	**699.4**
Gross Margin	*49.0%*	*49.0%*	*49.0%*	*49.0%*	*49.0%*	*49.0%*	*49.0%*
Operating Profit	**72.5**	**18.9**	**19.9**	**22.9**	**37.8**	**99.5**	**590.4**
Operating Margin	*8.2%*	*8.5%*	*8.5%*	*8.5%*	*8.5%*	*8.5%*	*8.5%*
Net Income	**50.9**	**14.2**	**14.9**	**17.2**	**28.3**	**74.6**	**91.4**
Profit Margin	*5.8%*	*6.4%*	*6.4%*	*6.4%*	*6.4%*	*6.4%*	*6.4%*
EPS	**$ 1.77**	**$ 0.49**	**$ 0.51**	**$ 0.59**	**$ 0.98**	**$ 2.57**	**$ 3.15**

Company Background

iRobot designs and builds consumer robots that integrate automation into two core household cleaning activities- vacuuming and mopping. The company's vacuuming product is known as Roomba and the mopping product is known as Braava. The vast majority of sales are derived from the company's Roomba product, which is the pioneer product in the robotic vacuum cleaner (RVC) market. iRobot's portfolio of products features proprietary technologies for the connected home and advanced concepts in mapping, navigation, mobility and artificial intelligence. For more than 25 years, iRobot has been a global pioneer in the robotic vacuum market.

During 2016, the company finalized their transformation to a global consumer robotics company by divesting their defense and security business. iRobot sells their robots through a variety of distribution channels, including chain stores and other national retailers, through their on-line store, and through value-added distributors and resellers worldwide.

The charts below show iRobot's revenues based on product type, geography, and primary region. As can be observed, the company's core business is selling robotic vacuum cleaners in U.S., however the international business as a whole is slightly larger than the domestic business.



Source: Company Filings

The table on the next page shows the operating performance of the company over the previous four year period. As can be observed, the company has experienced growth each year with a strong increase in 2016. Note that the discontinued defense and security business' revenues are incorporated in the total revenue figures in 2014-2015. The company generated approximately $45mm and $55mm in defense and security revenues in 2014 and 2015, respectively.

$'s in 000's	2014	2015	2016	2017
Revenues	**$ 556,846**	**$ 616,778**	**$ 660,604**	**$ 883,911**
Revenue Growth %	14%	11%	7%	34%
Gross Profit	**258,055**	**288,926**	**319,315**	**433,159**
Gross Margin %	**46%**	**47%**	**48%**	**49%**
R&D	69,408	76,071	79,805	113,149
% of Revenues	**12%**	**12%**	**12%**	**13%**
S&M	86,091	97,772	115,125	162,110
% of Revenues	**15%**	**16%**	**17%**	**18%**
G&A	49,439	54,465	66,828	85,210
% of Revenues	**9%**	**9%**	**10%**	**10%**
Total Op. Ex.	**204,938**	**228,308**	**261,758**	**360,469**
% of Revenues	**37%**	**37%**	**40%**	**41%**
Operating Income	**53,117**	**60,618**	**57,557**	**72,690**
Operating Margin %	**10%**	**10%**	**9%**	**8%**
Other	(708)	2,353	3,804	3,676
Earnings Before Taxes	**52,409**	**62,971**	**61,361**	**76,366**
Tax Expense	14,606	18,841	19,422	25,402
Net Income	**37,803**	**44,130**	**41,939**	**50,964**
Profit Margin %	**7%**	**7%**	**6%**	**6%**

Source: Company Filings

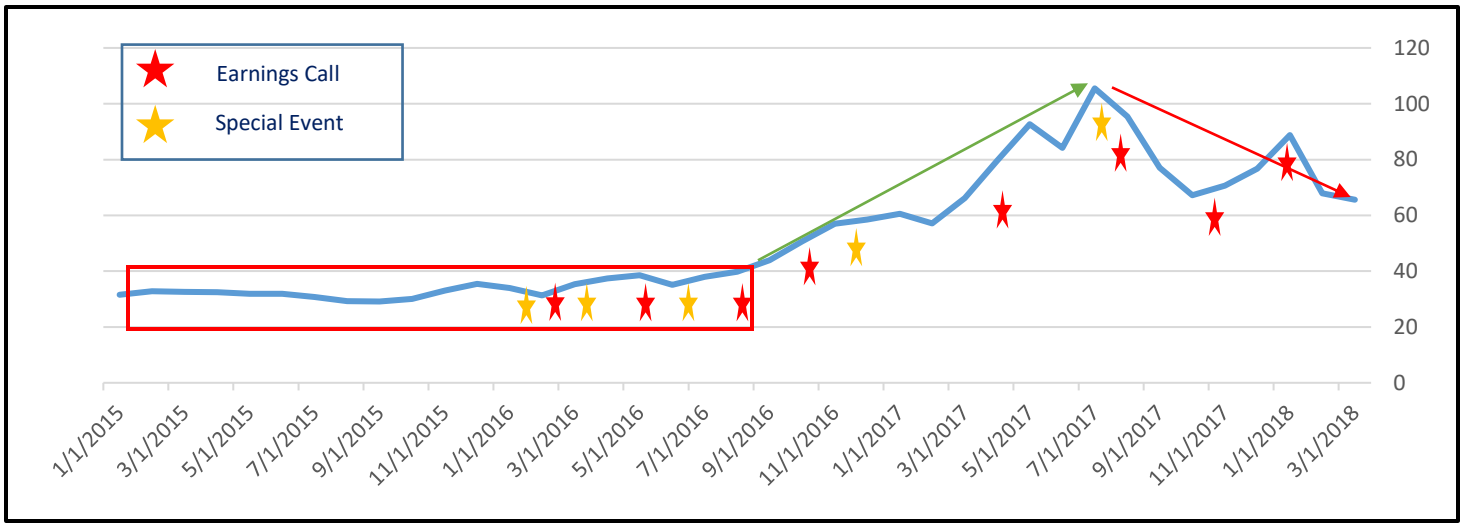
Stock Price Timeline

Despite strong performance over the reported time period, the stock was stagnant for an extended period of time until 2016. This year marked several changes in the underlying company including a successful proxy contest and complete exit from the defense and security business to focus on the consumer business. Also, significant strength in the consumer business caused investors to get excited about the massive growth opportunity ahead of iRobot.

After several earnings beat and raises, the stock broke its long-term ceiling of $35, and rose ~175% between 2016 and mid-2017. This positive sentiment showed signs of weakness in mid-June 2017 when a negative report was published citing speculated slower growth. However, this reversed immediately when the company reported a very strong quarter in July 2017. The stock rose over 20% in a single day and continued gaining strength.

The positive trend reversed in a major way when a relatively unknown investor published a critical report that highlighted the expectation of a material decline in the stock. The cornerstone of the negative report was the conviction that the entrance of SharkNinja (Shark) in the robotic vacuum cleaner space would materially impair iRobot's revenue growth trajectory. This caused the stock to immediately fall almost -15% and has continued to trend negatively since this report was published. Also, another short seller has publicly expressed his short interest in iRobot as he also believed that Shark would "punch iRobot in the face" with its robotic vacuum cleaner.

STOCK CHART



Date	Event
2/4/16	iRobot announces the sale of the Defense and Security business to Arlington Capital for approximately $45mm after a 2 year sales process.
2/10/16	iRobot reports revenue that **beat** consensus estimates by 2.1% and earnings that **beat** by **7%**.
2/18/16	iRobot announces that activist investor, Red Mountain Capital, intends to nominate two board of director candidates thus starting a proxy contest.
4/26/16	iRobot reports revenue and earnings that **beat** consensus estimates by **2.5%** and **2,500%**, respectively.
5/25/16	iRobot reports preliminary results of proxy contest that defeated Red Mountain.
7/26/16	iRobot reports revenue that **met** consensus estimates and earnings that **beat by 142%.**
10/25/16	iRobot reports revenue and earnings that **beat** consensus estimates by **7%** and **63%**, respectively.
11/21/16	iRobot announces acquisition of Japanese distributer for $15mm, which is the NAV.
4/25/17	iRobot reports revenue and earnings that **beat** consensus estimates by **9%** and **115%**, respectively.
6/27/17	Long-term iRobot short-seller, Spruce Capital, publishes a negative report citing competition from Shark.
7/25/17	iRobot reports revenue and earnings that **beat** consensus estimates by **5%** and **54x**, respectively. Also announces acquisition of European distributor for ~$141mm.
10/24/17	iRobot reports revenue and earnings that **beat** consensus estimates by **.4%** and **22%**, respectively.
2/7/18	iRobot reports revenue and earnings that **beat** consensus estimates by **2.5%** and **116%**, respectively.

Sources: Company Filings and Public Stock Data

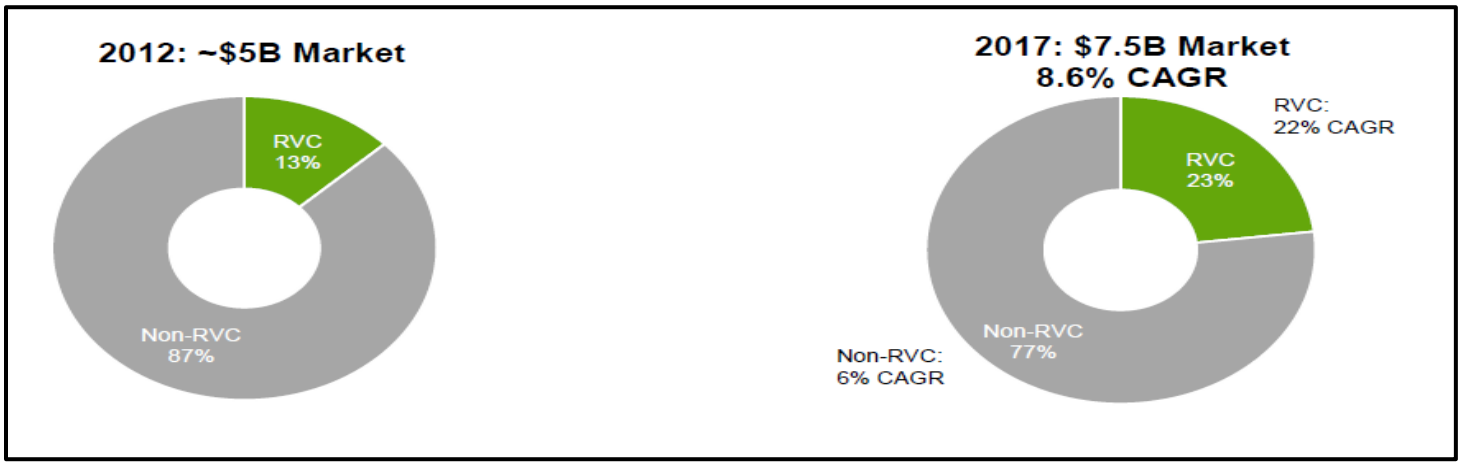
The sell-off presents a buying opportunity for informed investors who understand the true economics of the RVC industry, globally and domestically. An intensive analysis of the underlying variables that drive the industry clearly indicates that iRobot is firmly secure as the leader of this emerging industry. After conducting deep research on current microeconomic dynamics, we find it almost laughable that critics are so convinced that the Shark robotic vacuum cleaner will disrupt iRobot's reign in any way.

These critics clearly do not understand consumer behavior in this industry. They significantly discounted the value of iRobot's brand in the RVC market, which has literally been created by iRobot. They also significantly overestimated the value of Shark's brand in the RVC market. An informed investor would understand that the traditional vacuum industry is very different from the robotic vacuum industry. Short sellers do not understand the decision criteria used by robotic vacuum customers. This lack of understanding will certainly be the source of great pain if they remain short for much longer.

The fact of the matter is that Shark has fundamental flaws in their product and go to market strategy that seems to be causing a very weak product launch. This is exactly where the public shorts/critics went wrong- they made significant assumptions without even waiting to observe Shark's product and pricing strategy. Now that Shark's RVC has launched, the company only has so long before their robotic vacuums either gain traction or fail.

Investment Thesis 1: The RVC Market is at the Beginning of a Major Inflection

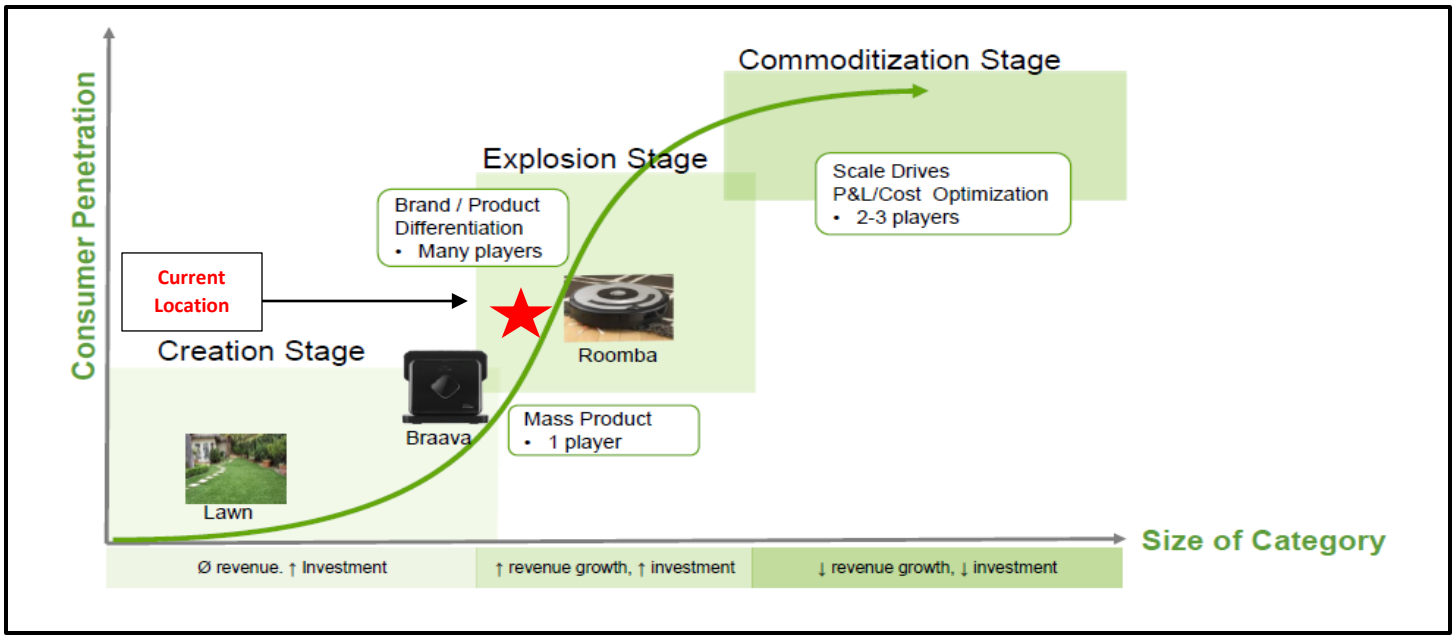
iRobot is at the forefront of a high-growth, disruptive industry that is still in the early stages of growth. Although the company launched the first robotic vacuum cleaner in 2002, robotic vacuum cleaners are only beginning to penetrate the $7bln premium (above $200) vacuum cleaning market. The charts below show the accelerating growth of the RVC market on top of growth in the overall vacuum cleaning market.



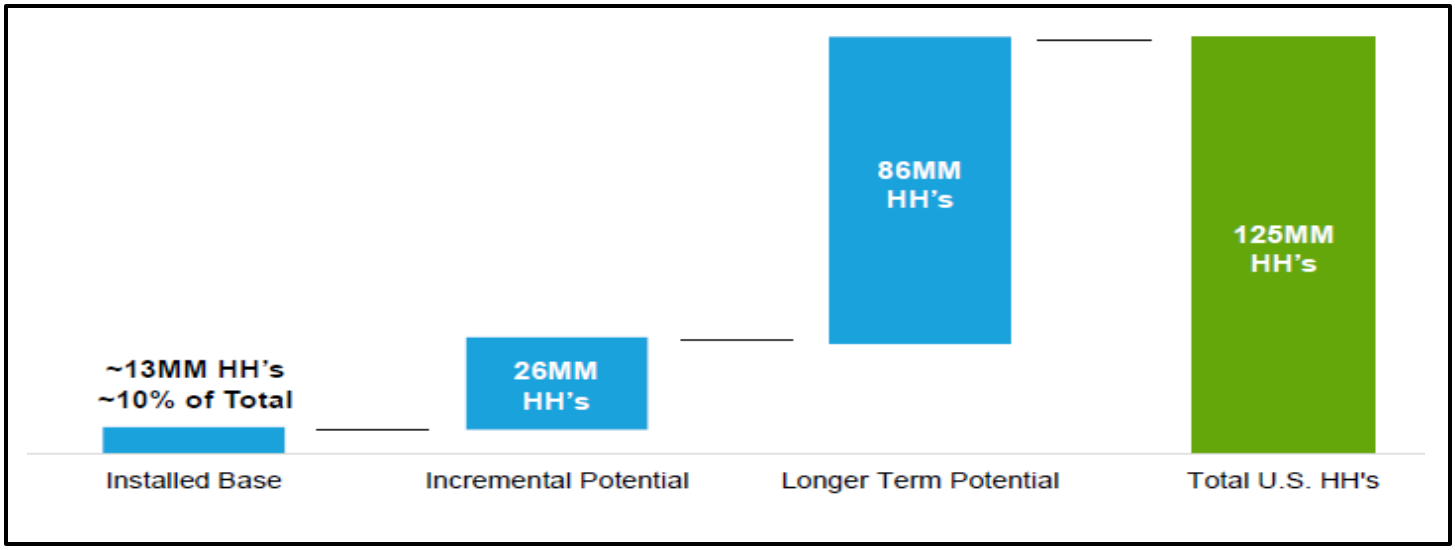
Source: Company Filings

While this growth is very positive, evidence supports the case that there is much more growth ahead that dwarfs current levels. iRobot's internal market analysis indicates that only 10% of domestic households have been penetrated, which equates to about 13mm households. More importantly, the analysis also indicates that the next segment of the market is an incremental 26mm households. Their research has shown that branding centered on product leadership and word of mouth testimonials are the keys to unlocking the next segment of the market.

Given the speculation that potential customers have on the effectiveness of robotic vacuum cleaners, many of them need validation from friends and family who have adopted the technology. People have varying degrees of willingness to adopt a new technology, which determines where potential customers are located in the technology adoption curve. The illustrations below show the technology adoption curve and the total addressable market.



Source: Company Filings

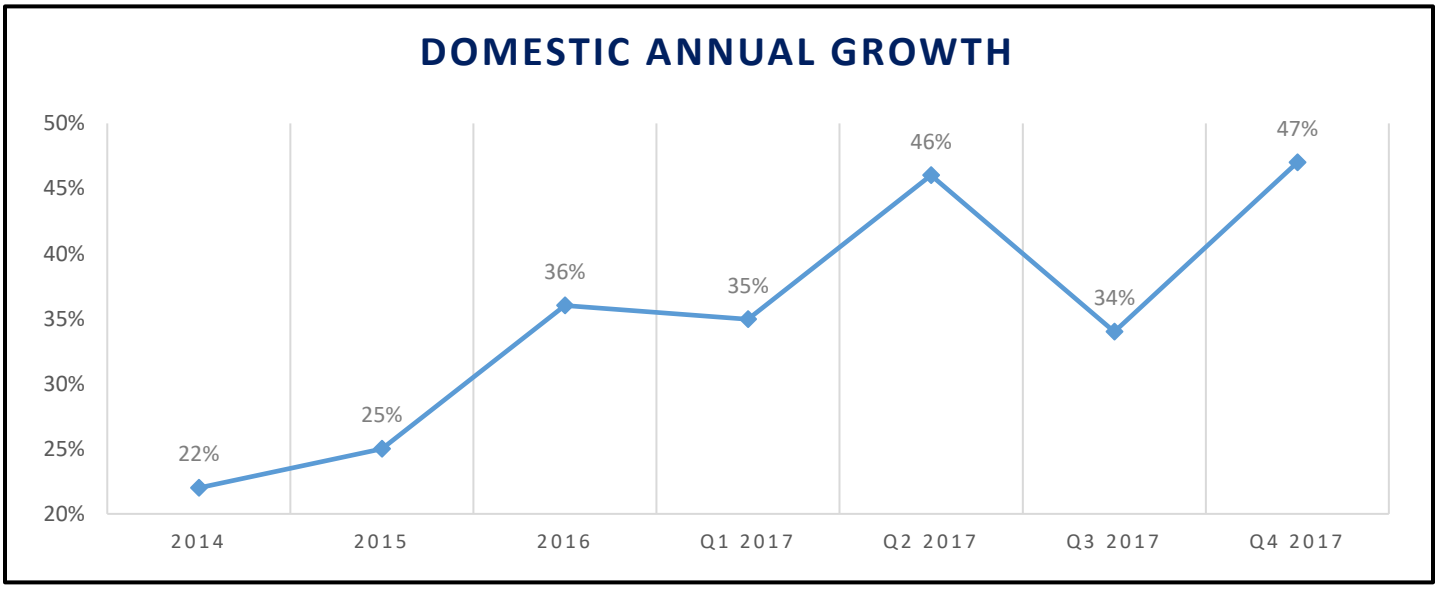


Source: Company Filings

The continued adoption of this technology is expected to increase the size of the global RVC market at a CAGR of 15% through 2021, according to analysis done by iRobot and several industry consulting firms (NPD, Euromonitor, etc.). While we will not jump to conclusions about the specific timeframe of the next stage of adoption, we do find a high degree of confidence that these additional U.S. households represent a major opportunity for firms in the RVC industry, especially iRobot with its significant first-mover advantage from a product development, product portfolio, and branding perspective.

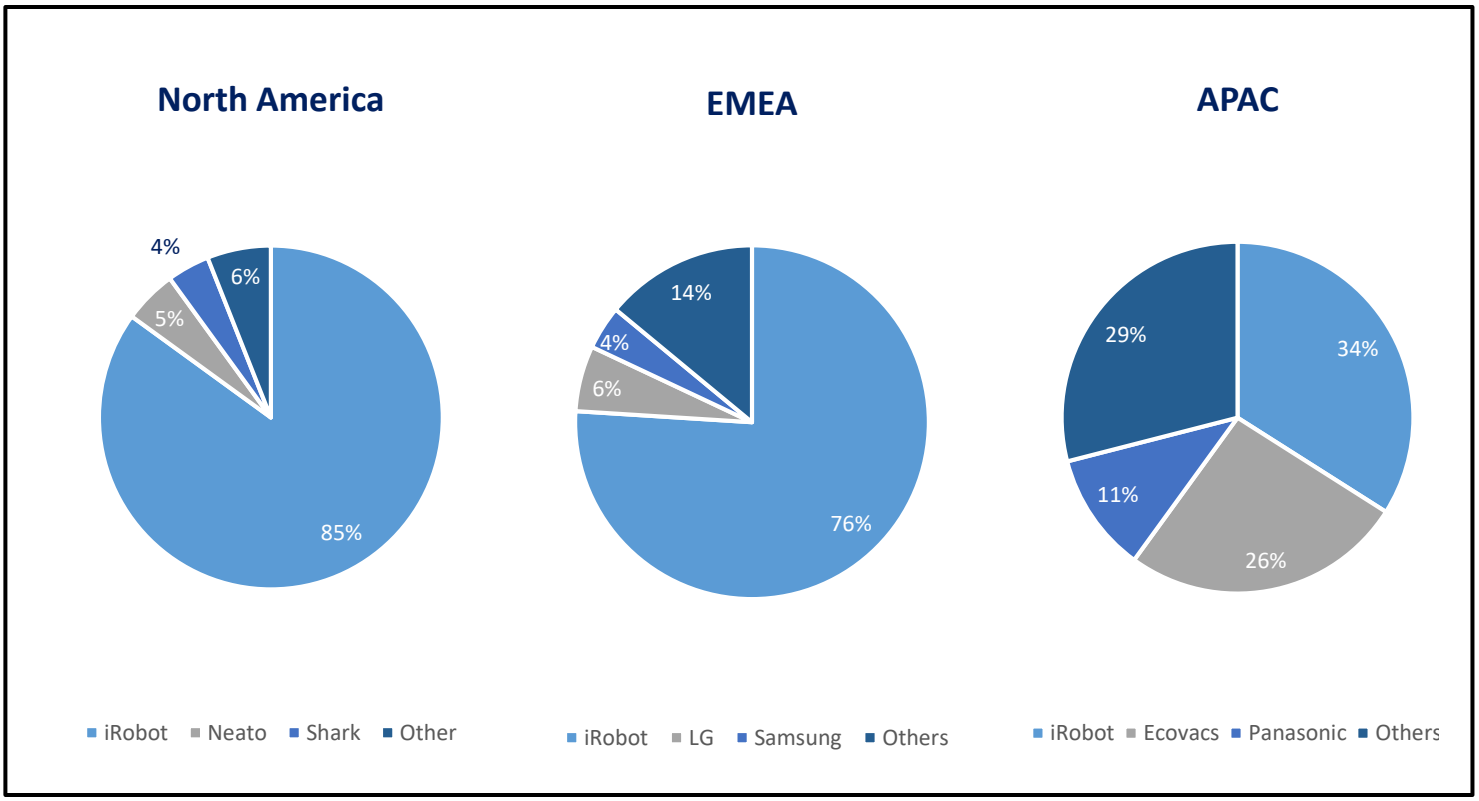
iRobot has exhibited a strong ability to monetize their technology in a truly dominating fashion. In 2017, NPD reported that iRobot's Roomba 650 was the number two selling vacuum cleaner on the market, which includes all vacuum cleaners, not just RVCs. Additionally, three other iRobot vacuum cleaners are in the top 10 vacuum cleaners, including traditional vacuums. While the total revenues included in the company background section are strong, the aggregate results overshadow the strength in the core domestic business.

Outside of China, iRobot essentially developed the entire RVC market as they were the first-mover in each market. Over the years, their dynamic product portfolio and better technology has enabled iRobot to retain the lion's share of the global market, especially in the domestic business. The charts below show the annual revenue growth rates in the domestic business, iRobot's global market share, and market share by primary geographic region. While being the first-mover carries more uncertainty and potential financial losses, it also has enormous upside if successful. iRobot has been reaping the rewards of being first to market with a viable RVC product.



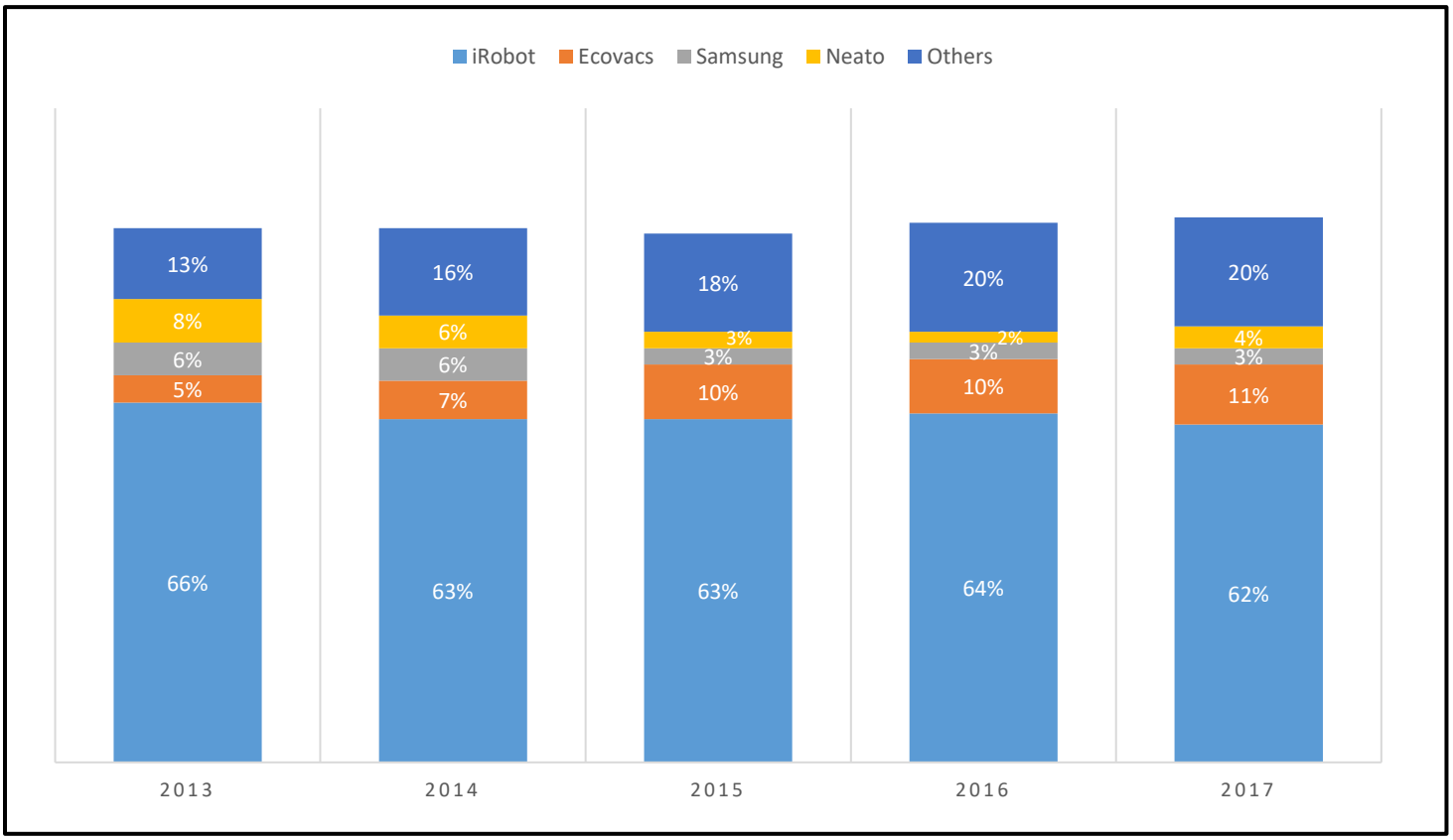
Source: Company Filings

Market Share by Region



Source: Company Filings

Global Market Share



Source: Company Filings

Investment Thesis II- iRobot will Continue Dominating the Competition in 2018

iRobot has several competitive advantages that drive revenue growth and secure market share. The company has a clear leadership position in the premium ($200 and above) segment of the market based on much more sophisticated technology (over 1,000 global patents), developed over decades, that supports a broad product assortment. The company employs a "good, better, and best" approach to product assortment. Each "category" has about two RVC options with varying functionality at incremental price points. iRobot also offers financing options through 'Affirm", which makes an investment in a top-tier RVC more accessible.

Source: Company website and Amazon

iRobot's products have industry-leading technology, developed over multiple generations, that have been tailored to customer's RVC preferences. iRobot leverages the feedback received from over 10 million Roomba customers to allocate their $100mm annual R&D spend to develop differentiated functionality and features. With the exception of entry-level Roomba 614, the entire current generation is comprised of connected robots to position the company as an integral part of the "smart home". The iRobot HOME App helps users get the most out of their experience by enabling increased usability, customizable cleaning settings, and over-the-air software updates.

The entire product suite incorporates several unique features and functionality including the following:

- Patented 3-stage cleaning process,
- Patented "Dirt Detect" technology (utilizes optical and acoustic sensors to "see" dirt),
- Patented edge sweeping brushes that are angled at 27-degrees,
- Patented iAdapt navigation system (adapts to clutter and furniture), and
- Patented multi-surface brushes (engineered with rubber debris extractors instead of brushes with bristles that are prone to tangling and must be manually cleaned).

iRobot's premium models have enhanced features and functionality. For instance, the premium options have more sophisticated scheduling options, greater battery life, 5x-10x more suction power, and autonomously resumes cleaning after recharging. iRobot employs a cascade approach to innovation that consists of investing 13% of revenues on R&D, primarily towards developing cutting-edge technology for the premium series. iRobot then cascades the technology into the "good and better" products through product reengineering and scale efficiencies.

iRobot's "good, better, and best" approach provides customers with a full suite of industry-leading products to choose from based on their income level, household needs, and confidence in iRobot. Management has strong data showing that customers entering the franchise at the 600 series level frequently upgrade when they repurchase 2-3 years later. This is on top of many new customers entering at a higher point in the franchise. Given that 1/3 of purchases are repeat customers, iRobot has a strong pipeline of demand for the premium line.

While the vocal critics seem to think that customers primarily focus on price when choosing a robotic vacuum cleaner, iRobot's success is literally evidence that customers are value conscious and are willing to pay premium prices so long as the technology works as promised. Otherwise, the company would not have been so successful given the cheaper alternatives by well-known traditional vacuum brands. Also, management continuously states (as recently as the Q4 2017 earnings call) that the distribution of sales is "barbell-like" with the entry-level 600 series and the premium 900 series uniformly accounting for the majority of RVC revenues. This means that a substantial portion of customers bypass the lower priced 600 series, which is still much better than competing brands, to willingly pay a material premium for the 900 series.

iRobot's critics simply do not understand the consumer preferences that drive purchase decisions in the robotic vacuum cleaner market. We also question if they understand the difference between the competitors' offerings and iRobot's Roomba suite of products. Robotic vacuum cleaners are more similar to technology products than household appliances, therefore consumers approach the purchasing decision from a different angle. Consumers need to feel confident that the product will perform with excellence. Based on iRobot's countless awards and impeccable reviews on sites like Amazon, consumers are highly satisfied with the Roomba suite.

While the vocal critics of iRobot believe the entrance of Shark into the RVC space will present iRobot with "much needed" competition, they neglect the fact that iRobot has already defeated many new entrants in 2015 and 2016 in addition to performance that shows iRobot is beating new entrants that entered the market during 2017. While an 85% domestic market share would lead one to believe there is no competition, the fact of the matter is that iRobot has won their market share by offering a much more compelling value proposition. The illustrations below show the level of competition that iRobot has faced and defeated in recent years.

2015

Source: Company Filings

2016

Source: Company Filings

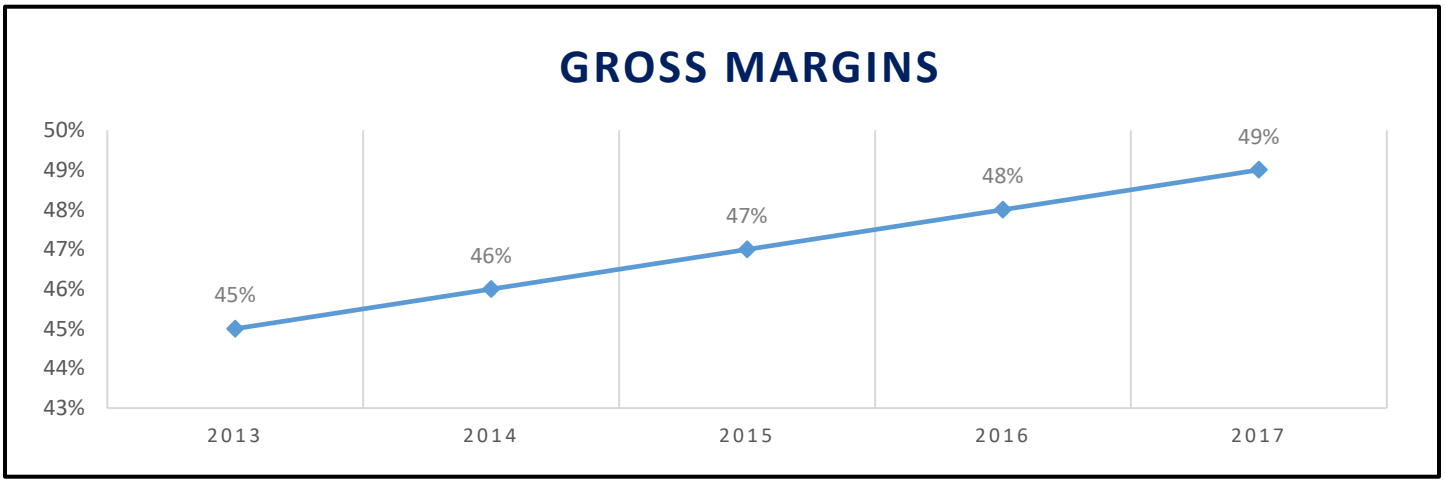
Interestingly, iRobot gave conservative guidance throughout 2016 anticipating retailers to stock the influx of new products coming into the market. This led to several beats and raises throughout the year. According to the company on the Q4 2016 earnings call, *"what we saw heading in to the fourth quarter was a lot of retailers talking about the potential of two competitors entering the marketplace, which led to some of our conservative estimates earlier in 2016. And while there was some new product launches in the back half of 2016, they did not meet expectations and failed to get any momentum."* As a result, sell-through increased materially in Q4 as retailers needed to increase their iRobot inventories as demand exceeded expectations despite the competition. This is evidence that consumers are selective in their purchasing decision beyond price and name recognition.

Management also provided the following commentary in the same earnings call:

> *"Our products, from a price and performance perspective, are really offering the best value proposition. Again, we have multiple offerings on a premium scale. And what we found with the competitors to date is that the combination of the price point they're coming in at and the features, functionality and, ultimately, the quality of the experience for the consumers is not resonating. As we went into the holiday season last year, again, we had the Hoovers, the BISSELLs, BLACK+DECKERs set were making a big push. They did get onto retail shelves for the holiday season. But their performance was not very good, and we ended up seeing increased orders from our retailers because our products were doing so well versus those new entrants in the market. And again, I think it's a combination of the price points and the functionality, the value, the quality that we offer the consumers and the experience."*

iRobot's dominance has continued throughout 2017 as the company has continued to grow revenues far ahead of the industry growth rate. Their dominance can also be seen in the fact that the Roomba 652 was ranked #1 in robotic vacuum cleaners, #1 in all of floor care, and #2 in all of home and kitchen products, during the most recent "Prime Day" on Amazon (July 11th, 2017). This is significant given the increased availability of cheaper products compared to other years. Additionally, management stated that the company sold over 100% more products in Prime 2017 than they did in Prime 2016, which was over 100% greater than sales in Prime 2015.

iRobot's critics also argue that the entrance of additional products will cause the company to drastically reduce prices, which would significantly reduce their strong gross margins. This is based on unsubstantiated assumptions primarily, because iRobot has actually increased gross margins even with the addition of the cheaper 600 series. The company has consistent margins across the product suite, therefore increased volume from the lower priced 600 series does not impact margins at all. This is something management has stated on several occasions, however critics seem to overlook this margin parity across the product suite.



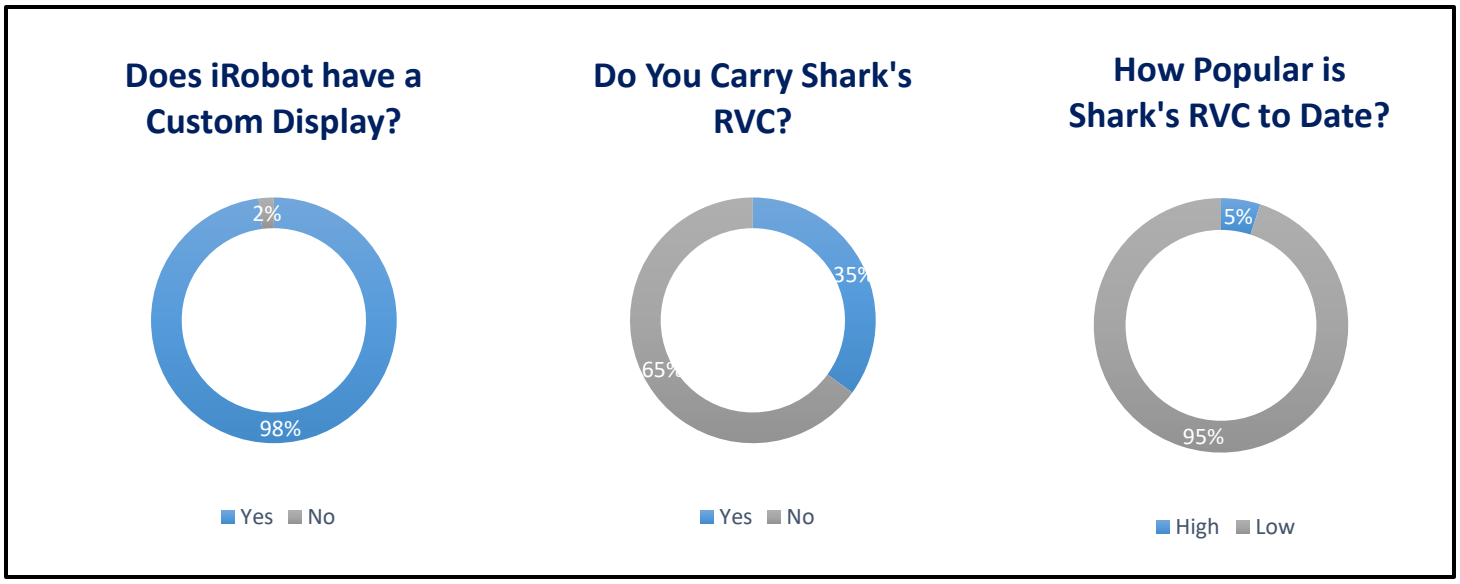
Source: Company Filings

Another competitive advantage iRobot has is the strong IP portfolio that protects the proprietary technology they have developed over the last two decades. This technology has consistently placed iRobot within the top 10 of IEEE's (Institute of Electrical and Electronics Engineers) "Top 20 Patent Powerhouses- Electronics" ranking. iRobot (5th place) finds itself listed with the likes of Apple (#1), Sony (#7), LG (#6), Panasonic (#11), Dolby #14), and GoPro (#10). After competitors launched their products in 2015 and 2016, iRobot studied them to ascertain the likelihood that competitors violated any of the firm's patents.

This analysis led iRobot to file an IP infringement case with the ITC on April 18th, 2017 to force suspected violators to take their products off the market. The suit included Hoover, Bissell, Black & Decker, and their respective Chinese or Taiwanese manufacturers. On September 14th, 2017 iRobot announced an agreement with Micro-Star (a major manufacturer) relating to the case. Micro-Star agreed to pay an undisclosed amount to iRobot and exit the robotic cleaning industry worldwide in exchange for iRobot removing them from the suit. While one vocal critic sees iRobot defending their IP as a sign of weakness, we do not subscribe to the notion that a company should bear the risks of being a first mover and spend hundreds of millions of dollars just to have their IP stolen.

To better understand the dominance of iRobot, a quick visit to your local Best Buy, Target, Wal-Mart, or Bed, Bath, and Beyond will provide a crystal clear illustration of why new entrants struggled to attract customers away from iRobot. You will quickly observe that iRobot is very likely to be the only brand whose products are housed within a massive custom display, whereas the other brands are likely grouped together making any individual brand rather obscure. This physical display plays a major role in brand positioning in the minds of consumers. This set up places iRobot in a league of its own and makes it almost impossible for another brand to stand out.

We conducted a nationwide survey to gain an understanding of the presentation of brands in key retail channels as well as the demand the new Shark product. The survey consisted of 25 locations per top retailer (Best Buy, Target, Wal-Mart, and Bed, Bath and Beyond) spread across the country. As seen below, iRobot is prominently placed in almost all stores, the Shark robotic vacuum is often not carried, and its traction is very low.

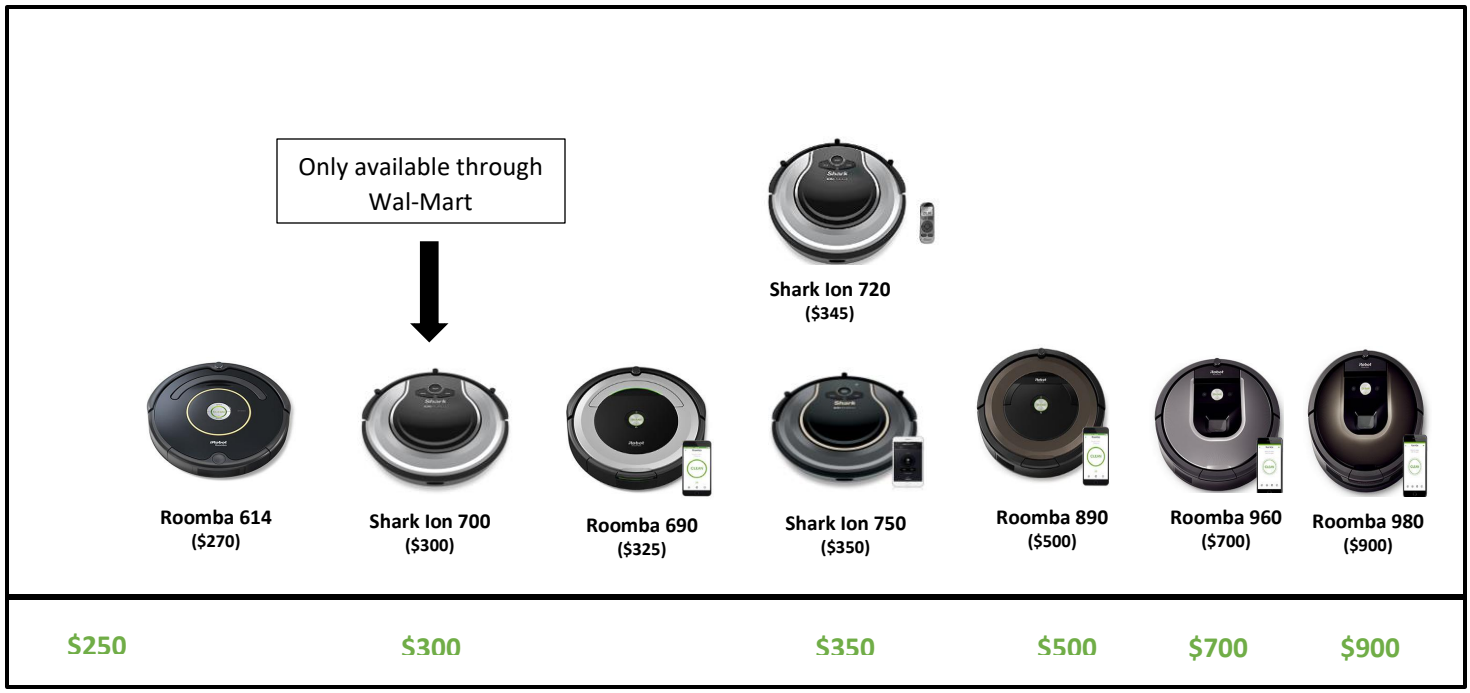


Source: Surveys of Best Buy, Target, Wal-Mart, and Bed, Bath, and Beyond

Given that iRobot's stock took a significant hit due to speculation that Shark's robotic vacuum would impair iRobot's growth trajectory, we conducted targeted research on Shark's recent launch to assess the reasonableness of the speculation. The first major concern we have with the critics' argument is the fact that Shark's RVC product had not even hit the shelves at the time of the criticism. These critics placed an enormous amount of confidence in Shark's brand equity to believe that it will disrupt the RVC industry dynamics by simply entering the market.

We have heard the comparison to Shark taking Dyson's market share in the traditional space, however the economics are much different in the RVC industry. We believe it is fundamentally flawed to extrapolate Shark's ability to disrupt a high-growth industry based on Shark's penetration of a mature industry. The competitive landscape is much different and the consumer preferences are much different. Most importantly, the critics did not know Shark's go-to-market strategy when they casted doubt on iRobot's growth. The critics assumed that Shark would offer a lower costing and less sophisticated version of the Roomba to force customers to choose between price and quality. After all, disruption only occurs from being much better and/or much cheaper.

Shark officially launched their RVC in mid-September 2017 and we have found the strategy to be highly flawed. While Shark has developed an iRobot knockoff with regard to design and basic functionality claims, the product is far less sophisticated yet the price is actually more expensive than the 600 series of Roomba. This pricing decision is completely the opposite of what the critics assumed Shark would do; they assumed Shark would price their offering materially below Roomba. The chart below shows how the offerings compare with regard to price.



Sources: Amazon and Wal-Mart Websites

To gain insight into how customers are responding to the Shark products, we analyzed customer review data on several platforms. Our findings are very interesting in that they reveal not only very low number of reviews for a "hot new product", but also the fact that Shark has recently starting giving away products in exchange for reviews. It seems that Shark is beginning to learn that consumers need validation from other consumers before they invest in a robotic vacuum cleaner. Firms with a limited track record are at a great disadvantage to the trusted Roomba.

Further analysis reveals that out of the low number of reviews (even for a new product), a fraction of these reviews were written by people who actually purchased the product- this is a very bad signal for demand levels. A quick glance at iRobot's reviews shows several thousand of very happy customers as opposed to a small sum of "paid reviews" that Shark has, which prospective customers will see and judge. Importantly, almost 25% of reviews on Amazon were negative, citing poor technology that led to poor performance. We believe they made a mistake by not waiting to observe Shark's go-to-market strategy and the customer response before proclaiming Shark as a real threat.

The fact that Shark is essentially paying for reviews should be a very negative signal that the launch is not going as planned. The reviews are clearly marketing material and seem to be very disingenuous, which prospective customers will easily observe. Eventually Shark will have to lower their prices, which still is unlikely to sway customers away from iRobot. We expect iRobot to continue dominating the industry until more viable competition arrives, which bodes very well for the stock over the next year, at least.

As can be seen from the chart below, Shark's robotic vacuum cleaner is not even in the top 10 vacuum cleaners for 2017. Additionally, Shark only generated a little over $20mm in sales from their robotic vacuum cleaners based on their 4% market share in the $532mm domestic industry. Using an average price of $300, this equates to just 71,000 units being sold since the launch in September 2017, whereas iRobot sold almost 600,000 units in Q4 2017. While Shark will capture some market share, there is no evidence that Shark will displace iRobot, or materially impair iRobot's market share.

Source: NPD Retail Tracking Report

Investment Thesis III- iRobot has Significant Upside in the International and Wet Floor Care Businesses

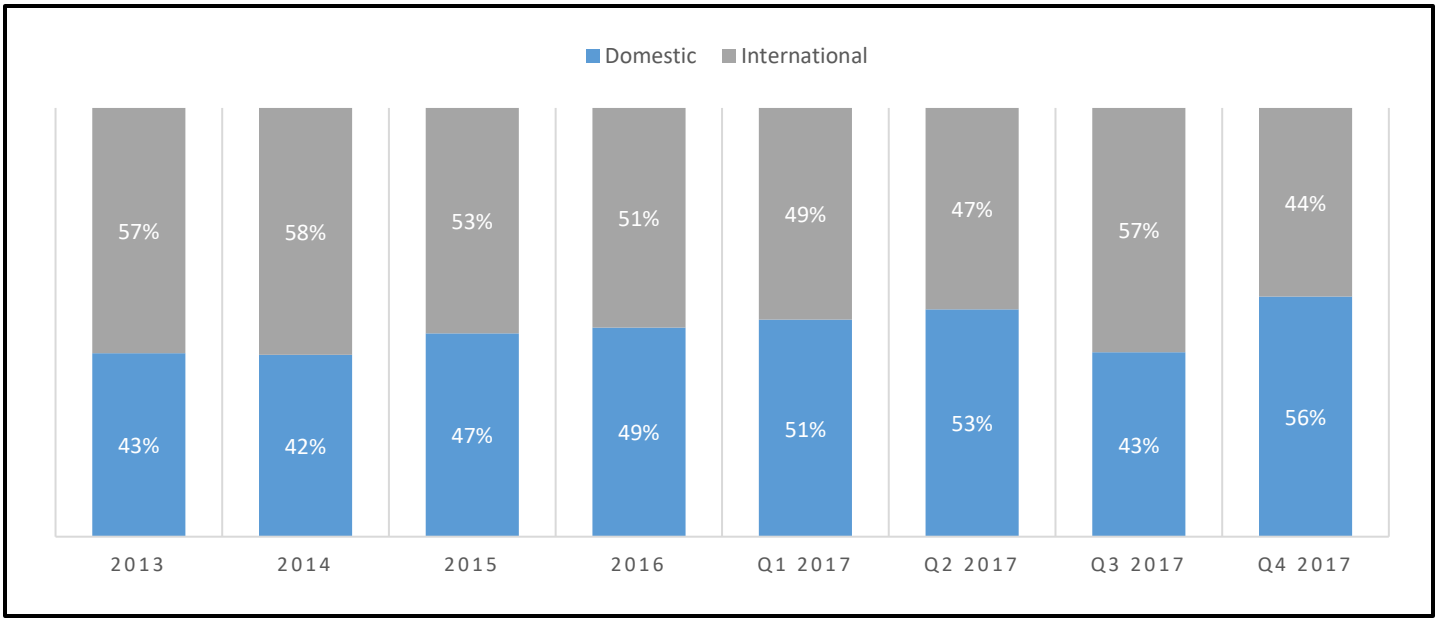
In addition to the momentum in the core RVC domestic business, iRobot has considerable opportunities for growth in their international business. While the critics of iRobot are focused on the potential ramifications of Shark's entrance into the domestic market, they are clearly overlooking the fact that iRobot is a global business. Even if Shark started gaining traction, which the evidence indicates is highly unlikely, iRobot has material international revenues to support the company's growth trajectory.

$'s in millions	2013	% change	2014	% change	2015	% change	2016	% change	2017
China	10.0	200%	30.0	70%	51.0	-3%	49.5	-41%	29.3
Japan	97.6	-3%	94.7	-15%	80.1	6%	85.0	25%	106.3
EMEA	165.4	18%	195.3	-1%	192.9	5%	203.5	46%	297.1
Total	**273.0**	**17%**	**320.0**	**1%**	**324.0**	**4%**	**338.0**	**28%**	**432.6**

Source: Company Filings

Historically, the international business has generated considerably more revenues than the domestic business. The international business consists of several countries that have embraced robotic vacuum cleaners at a rate similar to the U.S., however iRobot was able to penetrate these markets sooner than the U.S., because of their international go to market strategy. iRobot leveraged local firms to serve as distributors in the international markets to tap into the high demand these markets had for iRobot's products. This approach enabled the firm to quickly and simultaneously develop their operations in the APAC (Japan and China) and EMEA (several countries) markets.

Revenue Mix



Source: Company Filings

While the international business is a material portion of revenues, the revenue trends show that the international business is not realizing the same type of momentum as the domestic business. Outside of macro trends, the primary reason for the headwinds in the international markets is rooted in iRobot's go-to-market strategy. The manner in which iRobot utilized local distributors to penetrate international markets was actually very similar to a joint venture approach. Unlike traditional distributer relationships that are primarily beneficial from a supply chain perspective, iRobot's distributors were responsible for marketing and sales activities.

While this helped iRobot enter international markets with very limited capital investment, it has started to hinder the company's ability to further scale the international businesses. In order for iRobot to continue growing revenues, the company must continue investing in sales and marketing to raise awareness. As the first-mover, iRobot bears the greatest burden with regard to developing the RVC market as many customers simply are unaware of the sophistication and value proposition of the industry. This is common in almost every new industry, which is why many firms wait until the market has been somewhat developed before entering.

In Japan, the distributor's founder had died and the successors allowed investments in sales and marketing to materially slow. iRobot tried to press the distributor to continue investing in sales and marketing, however it was unsuccessful. Additionally, they believed the execution of the marketing actually done was off-brand. A similar situation was occurring with the European distributor where iRobot witnessed a decrease in sales and marketing along with off-brand marketing. iRobot believed that both distributors were impeding the growth opportunities present in both markets.

As a result, iRobot decided to purchase the distributors' businesses to gain direct control of sales, marketing, branding, channel relationships and customer service. The Japanese distributor acquisition as announced in Q2 2016 and closed in Q2 2017. The European distributor acquisition was announced in Q2 2017 and closed in Q4 2017. iRobot had already started allocating capital ahead of the acquisitions to increase the sales and marketing activities in these markets.

This investment has caused sales and marketing expense as a percentage of revenue to increase 160bps (or 10%) in 2016, which has persisted in 2017. The specific marketing strategy has been tailored to each country represented in the European business as well as Japan. This has resulted in the Japanese business going from a 15% decline in 2015 to a 25% increase in 2017. The European business has gone from a 1% decline in 2015 to a 46% increase in 2017.

The European business has increased 35%, 10%, and 31% in Q1, Q2, and Q3 2017, respectively. The Japanese business has increased 20% in Q1 2017 and declined 20% in Q2 2017, which was expected due to inventory clearing ahead of the acquisition close at the end of Q2 2017. In Q3 2017, the Japanese business grew 65%. Based on these figures, we can infer that Q4 2017 was even stronger than Q1-Q3 2017, although the specific figures were not disclosed.

The Chinese business has been experiencing a different trend than the Japanese and EMEA businesses. iRobot only recently entered the Chinese RVC market a few years ago. While the company was not the first mover in China, iRobot is the first mover in the premium space of the Chinese market. This unique positioning helped iRobot take market share from the incumbents, however in sales growth stalled in 2016. This was primarily caused because iRobot did not appreciate that Chinese customers shopped online much more than those in other markets.

iRobot had partnered with a local distributor that was more focused on physical channels than digital. Management began to observe sales data and found that e-commerce had much more traffic than traditional retail. In response to learning of these economic dynamics, iRobot decided to open a Shanghai office to have more control of the marketing and sales activities in the country. They also decided to partner with an additional distributor that had a focus on e-commerce in China.

Also, management underestimated demand for the company's premium products ahead of China's major shopping days (11/11 and 12/12). This led to overstocking the lower tier 600 series and understocking the higher tier 800 series. While this was a negative for 2016 results, it provided management with great lessons about the Chinese customer. Sales growth has resumed in 2017 with annual increases of 25% and 38% in Q1 and Q2 2017, respectively. However, the growth declined in Q3 and Q4 2017 as management cited intense competition for lower end products, which Chinese consumers seem to prefer.

More than the core RVC product, iRobot has a major growth opportunity in the wet floor care (WFC) space. iRobot is the first, and only, firm to bring robotic mops to the $3bln wet floor care industry. While iRobot has had a robotic mop (Braava) for some time now, the company devoted literally no marketing spend towards raising awareness for this product. The sales simply came from RVC/Roomba customers learning that iRobot also has a robotic mop. Even still, WFC accounted for 5.5% of total revenues as of 2015.

In March 2016, iRobot launched Braava Jet in the United States followed by releases in the other markets between August-October 2016. Braava Jet is a smaller and more technologically advanced version of the Braava. Both models incorporate technology to ensure the products work as promised just like the Roomba. iRobot has been positioning the Braava as a complement to the Roomba with bundle deals, which has been driving adoption.

Braava 300 Series
$300

Braava Jet
$200

Source: Company Website

Customers were immediately receptive of the Braava jet, which droves sales growth over 75% in 2016 despite being introduced later in the year in the international markets. This growth has continued in 2017 with Braava revenues up 26%. Now the wet floor care business accounts for almost 10% of company revenues, which is almost double the contribution in 2015. iRobot has substantial upside from this business, which is being overlooked by critics of the company.

A deeper look at the WFC category shows that the Japanese and Chinese markets were very receptive of the Braava Jet. Early results show that WFC is now a key driver of growth in these regions. In 2016, with only one quarter of Braava Jet on shelves, WFC sales grew 430% and 340% in Japan and China, respectively. In 2015, WFC accounted for 3% and 15% of sales in Japan and China, respectively. In 2016, WFC accounted for 15% and 50% of sales in Japan and China, respectively.

While the geographic breakdown was not given for 2017, the underlying demographics supports the view that Japan and China will continue adopting Braava at a faster rate than other markets. The primarily hard floor homes in China and Japan necessitates the need for daily mopping, even more so than vacuuming. As a result, customers in these markets find great utility in a robotic mop. iRobot's management believes that WFC sales are actually driving RVC demand in the Chinese and Japanese markets due to the home cleaning dynamic. Overall, iRobot is working to make these robots "talk with each other" to further cement the company in the Smart Homes space.

Forecast and Valuation

We are forecasting ~32% revenue growth in 2018, which we believe is conservative given recent trends, especially in the international business. Our margin assumptions are in line with management's expectations. Our revenue expectations are slightly higher than management's given the consistent outperformance over guidance over the last eight quarters. Our 2019 estimates reflect continued adoption of RVC as well as growth in iRobot's WFC business.

We are also expecting the international business to realize growth higher than the domestic business given a turnaround in growth as a result of management's actions detailed in the previous section. Importantly, we are expecting the company to continue dominating the RVC market as the competition is still weak. Given the high revenue and earnings growth, we expect the stock to continue trading at a premium P/E multiple.

Upon analyzing historical P/E multiples, we observed that the stock trades between 35x-37x the TTM EPS during times of doubt. Whereas the stock trades at 45x-50x the TTM EPS during times of optimism. Our price target is based on the stock trading at ~45x the 2018 EPS, which is highly conservative given that 2018 will prove that iRobot is still outdoing competitors. At a minimum, we expect the multiple to expand from current levels, however the stock will also likely rise given the earnings growth.

$'s in millions	2017A	Q1 2018E	Q2 2018E	Q3 2018E	Q4 2018E	2018E	2019E
Revenue	**$ 883.9**	**$ 222.3**	**$ 234.0**	**$ 269.1**	**$ 444.6**	**$ 1,170.0**	**$ 1,427.4**
Growth	*33.8%*	*32.3%*	*27.9%*	*31.3%*	*36.0%*	*32.4%*	*22.0%*
Gross Profit	**433.0**	**91.1**	**99.5**	**114.4**	**189.0**	**493.9**	**699.4**
Gross Margin	*49.0%*	*41.0%*	*42.5%*	*42.5%*	*42.5%*	*49.0%*	*49.0%*
Operating Profit	**72.5**	**18.9**	**19.9**	**22.9**	**37.8**	**99.5**	**590.4**
Operating Margin	*8.2%*	*8.5%*	*8.5%*	*8.5%*	*8.5%*	*8.5%*	*8.5%*
Net Income	**50.9**	**14.2**	**14.9**	**17.2**	**28.3**	**74.6**	**91.4**
Profit Margin	*5.8%*	*6.4%*	*6.4%*	*6.4%*	*6.4%*	*6.4%*	*6.4%*
EPS	**$ 1.77**	**$ 0.49**	**$ 0.51**	**$ 0.59**	**$ 0.98**	**$ 2.57**	**$ 3.15**

		EPS					
		$ 1.70	$ 2.20	$ 2.60	$ 3.00	$ 3.25	$ 3.50
P/E	30	51	66	78	90	98	105
	40	68	88	104	120	130	140
	45	77	99	**117**	135	146	158
	47.5	81	105	124	143	154	166
	50	85	110	130	150	163	175
	52.5	89	116	137	158	171	184

Source: Internal Calculations

Catalysts and Risks

Given that the stock is trading based on the revenue and earnings growth outlook, we believe the next couple of earnings calls will be catalysts for the stock to start trading based on a more positive sentiment. The fact that the stock fell so much on the back of negative reports from short sellers, evidence of continued growth should easily cause the stock to start trading as it did in 2016 and mid-2017. This is further supported by significantly higher activity in the options market, which has caused the implied volatility on IRBT options to increase over 50% since mid-July. This activity is highly predictive of material price movement once a catalyst occurs.

The key risk to iRobot's growth is weakness in the international business. We do not view competition in the domestic business as a valid risk at this time based on the competitive analysis detailed in the previous section. While anything is possible, we prefer to think in terms of probabilities. With regard to the international business, the key risk is that iRobot is not able to fully shift these businesses back to high growth without significantly more S&M investments. However, the early data is showing that the company is doing very well getting these businesses back to high growth.