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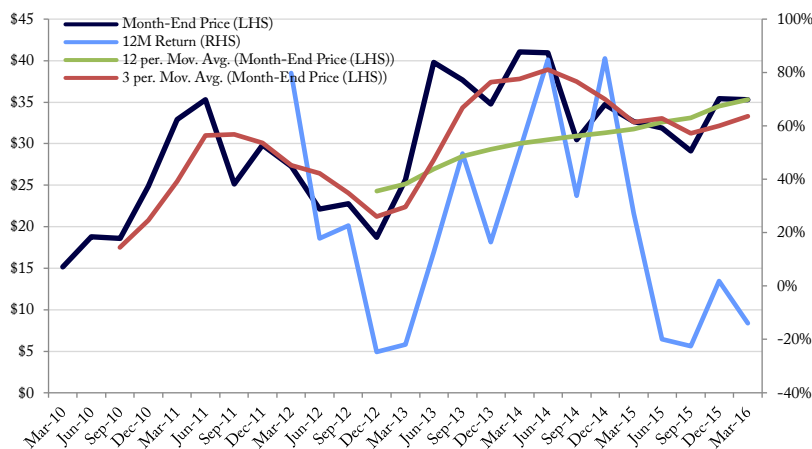
iROBOT CORP (IRBT)

SUMMARY

Industry	Consumer Goods – Appliances
Last Price (7/20/16)	\$36.50
52-Week High	\$39.00
52-Week Low	\$27.55
Market Cap (Mil)	997.15
Beta	0.98

RECOMMENDATIONS

Current Action	HOLD
Purchase Price	\$36
Sale Price	\$45



COMPANY DESCRIPTION

iRobot Corporation, headquartered in Bedford, Massachusetts, was founded in 1990 by roboticists from Massachusetts Institute of Technology. Their original design operated through two segments, home robots and defense and security robots. With the sale of iRobot's defense and security unit on April 4th, 2016 for \$45 million to Arlington Capital, iRobot became more focused on catering to the home and business robotics market. The company's aim is to revolutionize the way one cleans through robots such as Roomba for vacuuming, Scooba for floor scrubbing, Braava for floor mopping, Mirra for pool cleaning, and Looj for gutter cleaning. Before selling their defense and security segment, which is now known as Endeavor Robotics, they specialized in tactical ground robots such as the 310 SUGV robot and the small, lightweight 110 FirstLook robot. iRobot sells its products through chain-stores, its online store, and other distributors and resellers. Its defense robots were sold to the U.S. military and other government agencies.

INDUSTRY AND COMPETITORS

Consumer Goods – Appliances The Appliance industry consists of companies specializing in production of electrical and mechanical devices used in the household. iRobot's main competitors, however fall under a variety of industries ranging from diversified machinery to internet information providers. Industry and competitor statistics are below.

	Industry	IRBT	FANUY	ROK	HOLI	YASKY	ABB	WHR	GOOG
Market Cap	14B	997.12M	30.82B	15.52B	1.15B	3.49B	43.28B	13.33B	494.22B
Price/Earnings	20.7	25.1	20.16	20.93	11.43	15.98	23.64	18.72	29.29
Price/Estimated Earnings		20.86	N/A	19.25	10.03	N/A	16.53	10.24	18.19
Price/Sales		1.56	5.21	2.56	2.06	0.85	1.24	0.64	6.35
Price/Book	-63.4	2.51	2.48	6.98	1.71	1.93	2.91	2.78	4.01
PEG Ratio		1.53	0	3.98	1.12	0	3.05	0.94	1.28
Dividend Yield	2.3%	N/A	2.47%	2.44	N/A	1.47	3.88	2.3	N/A
Net Profit Margin	3.6%	6.88%	25.59%	12.58%	19.25%	5.44%	5.35%	3.59%	21.18%

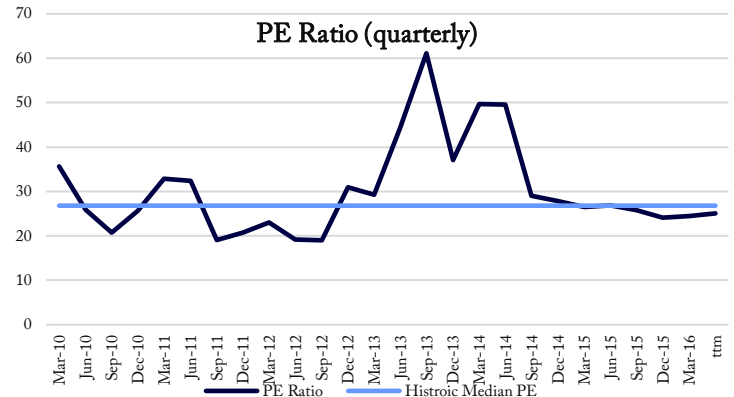


SIGNIFICANT PRODUCTS OR SERVICES

iRobot's most significant products come from their robots for the home including Roomba, Braava, Mirra, and Looj. They have also begun to cater to the business world with the introduction of Ava 500, a robot intended to provide a physical presence from a remote location.

VALUATION

Relative to history, valuations are below long-term averages. The chart to the right shows the PE ratio and its fluctuations over time. Data is selected starting in March of 2010 as prior to this, dramatic fluctuations in valuations were frequent from quarter to quarter, and therefore less meaningful. In this time period, PE has seen a high of 61.1 and a low of 19.0 but has seemed to stabilize around a long-term median of 26.8. Currently, iRobot's PE is 25.1 and is in the 33rd percentile. However, it is difficult to draw a valuation conclusion based on historic values due to the short history and limited stability over the full data series.

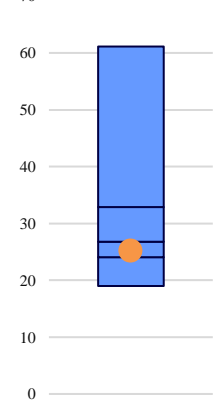


Similarly, as seen below, Price-to-Book, P/S, P/FCF, EV/EBITDA, and PEG are trading



well below long-term averages while P/OCF is currently trading slightly higher, in its 41st percentile. IRBT does not offer a dividend, but in 2016, a stock

PE Distribution



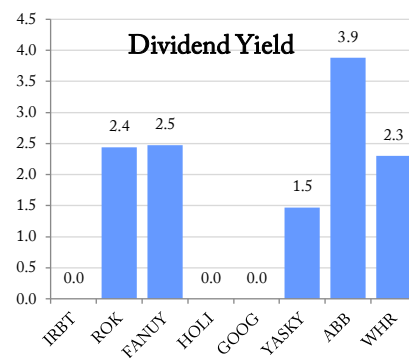
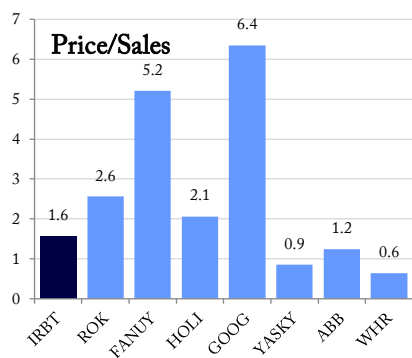
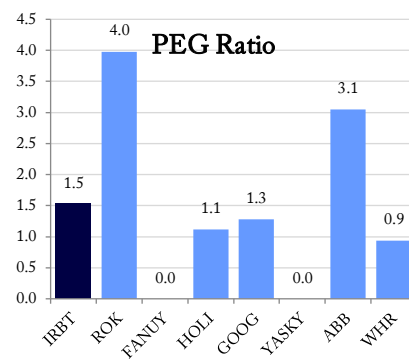
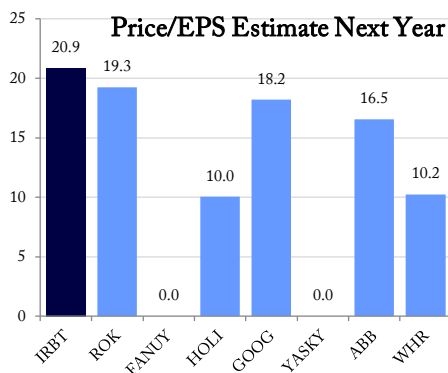
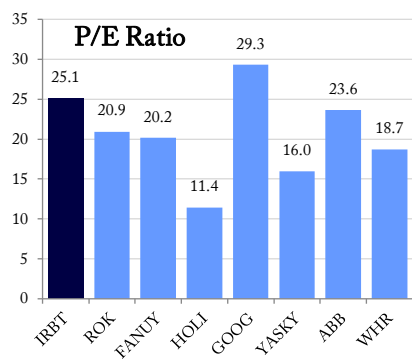
repurchase program of \$100 million was announced as iRobot intends to be committed to returning capital to stockholders while investing to grow the business to create stockholder value. Turning to the analysts, a forward PE of 28.8 is expected for IRBT, implying -13% growth making iRobot seem a less attractive investment as valuation is expected to drop over the next year.

Comparing IRBT to its nearest competitors, IRBT seems to be unique in their goal to create robots that “revolutionize the way people clean”. Many of its main competitors are in the industrial robot industry, which according to the International Federation of Robotics, saw sales growth of 29% in 2014. If iRobot wishes to revolutionize the home cleaning industry, they must follow similar growth patterns seen in the industrial sector. Currently, industrial robotics companies such as Rockwell, FANUC, Hollysys, YASKAWA, and ABB all have lower PE ratios suggesting a higher valuation for IRBT. Likewise, P/B, P/S, and P/Est EPS, give iRobot an attractive valuation relative to its industrial competitors. However, it is again difficult to draw a confident valuation conclusion based on these numbers due to the industry differences. Compared to Whirlpool, which also operates in the home appliance industry, IRBT sees more attractive valuation numbers, but WHR's lack of robotic appliances again makes for a difficult comparison. Lastly, Google stands as a partial competitor in that they are working on robotics technology but also supply a variety of other, more well-known products. Since Google is at the front of its industry, it is nonetheless important to pay attention to their robotics development over the next few years as they lead the way in innovation. The MIT Technology Review reports that although GOOG put Boston Dynamics up for sale, a company specializing in two and four-legged robots, they are still focused on innovating in the robot industry with more practical and commercialized opportunities such as robot arms. Below are valuation statistics for all competitors discussed above.



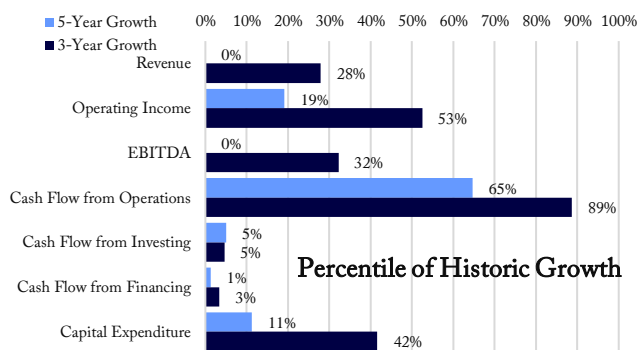
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GROWTH

Relative to history, 3-year growth in revenue, operating income, EBITDA, cash flow from operations, and capital expenditure see a significantly higher percentile compared to the 5-year numbers (seen below) implying larger, more recent growth. While this paints an optimistic picture, this trend can be explained by IRBT's success in overcoming the expected, sporadic trends seen in early stages of company development and the ability to establish a more long-term performance median. Apart from historic trends, the success of IRBT should also be judged on future expectations and whether these growth numbers will continue their upward trends. Before turning to the numbers themselves, which positively highlight IRBT, there are some news items and outside growth numbers that shed light on the future of the company. In a 2014 report, Business Insider hypothesized a 5-year growth rate of 17.4% in the market for home and office robots. While this is simply an analyst estimate, when looked at in conjunction with some iRobot and market events, this number certainly seems plausible. iRobot has shipped more than 10 million Roombas since the device launch in 2002 and is shipping approximately 1 million per year. Business Insider also reported that iRobot has 10% penetration in the vacuum cleaner market with expectations to increase this percentage. Lastly, iRobot announced this month that they would be partnering with Amazon Web Services to utilize the Amazon cloud and become connected with the consumer business and the "connected" home. These facts point to a bright future for IRBT and the home robot industry.



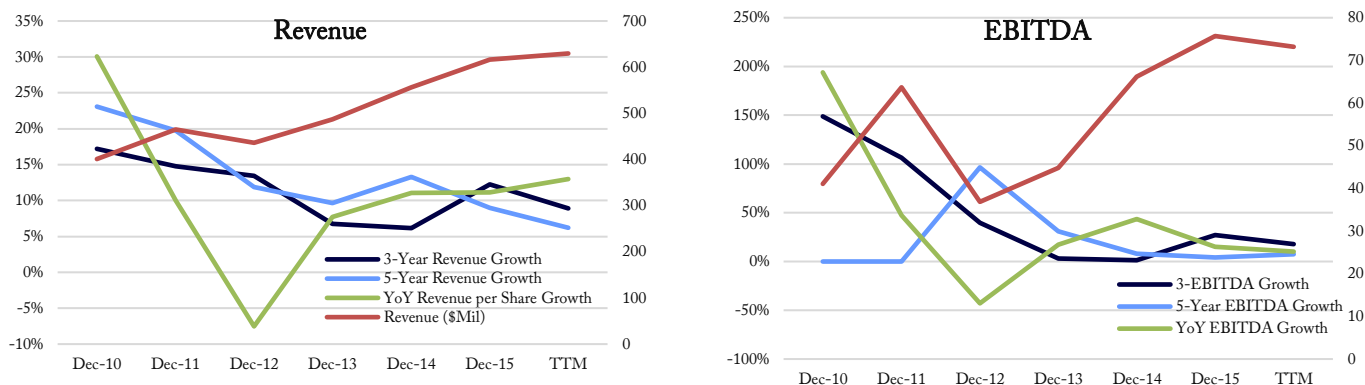
Turning now to the numbers, revenue, seen in the chart below, has increased constantly since 2012 with 3-year growth recently surpassing the all-time low 5-year growth value implying higher growth in the more recent years. Revenue itself is at a historic high of \$630 million. EBITDA, also shown in the chart below, sees similar trends



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with a constant increase since 2012 and the same 3-year versus 5-year growth patterns. Gross profit growth is at an all-time low for 5-year growth and in a similar position over the past 3 years and thus is not charted in the percentile of historic growth chart. While this is concerning, with the increasing revenue trends discussed above, there is hope for increased gross profit growth in the future.



Given iRobot's standing as a technology company, it is a bit concerning that research and development growth is at its lowest in both the 3 and 5-year window with growth numbers of 16% and 6.4% respectively. This is a more recent fall as the 5-year growth rate surpasses the 3-year growth rate. Cash flow from investing has decreased by a large amount in both the 3 and 5-year time frame, -158.3% and -173.1% respectively, implying that IRBT has not done much investing in other technology or made upgrades to their equipment. They had negative cash flow from investing in the early years but the cash flow has become less negative over time and now has a positive TTM value of \$3.59 million. This can also be attributed to the low growth in R&D over the past 5 years. Cash flow from financing has also seen negative values in the past two years and large negative growth in the 3 and 5-year period with a more recent 3-year growth rate of -237.9%. As discussed before, iRobot recently started their \$100 million stock repurchase program, which accounts for the most recent negativity in the cash flow from financing value.

Accounting for analysts' forecasts and looking at competitor growth, if iRobot wishes to revolutionize the home robotics industry just like industrial robotics took over the industrial sector, they should hope to have similar growth patterns. Using the current earnings per share and the analysts' earnings estimates for the next year, the industrial robotics companies ROK, HOLI, and ABB are expected to see earning growth of 9%, 14% and 42% respectively. IRBT is expecting 20% earnings growth, which is quite promising given the industrial robotics trends. The growth numbers for WHR and GOOG are also provided in the table above and are a bit higher than IRBT perhaps due to their long history and intangible value to the consumer.

	EPS Estimate Next Year	Earnings/Share	Earning/Share Growth
IRBT	1.74	1.45	20%
ROK	6.19	5.69	9%
FANUY	N/A	1.35	N/A
HOLI	1.81	1.7	14%
YASKY	N/A	1.67	N/A
ABB	1.02	0.85	42%
GOOG	33.48	24.58	61%
WHR	14.7	9.38	83%

Overall, the dramatic increase in growth from the 5-year to the 3-year window and the relative growth among industrial robotics competitors mark IRBT as a favorable investment. It is, however, difficult to draw credible conclusions simply based on these positive numbers, particularly in the case of revenue and EBITDA, but when thought about in conjunction with the industry and market news mentioned above, this growth looks promising and may even be sustained in the future. A few points of concern are the low R&D growth numbers and cash

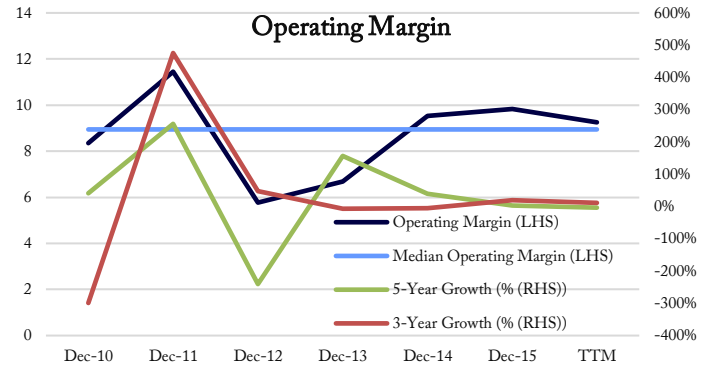


flow from investing given IRBT's standing as a technology company, but hopefully, the projected growth will allow iRobot to invest more heavily in technological and equipment innovation.

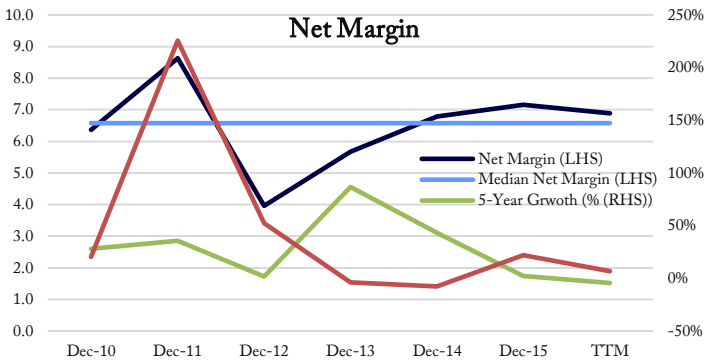
PROFITABILITY

Operating margin and net margin have exhibited similar trends over the more recent history of IRBT. Currently, operating margin has seen 11.4% 3-year growth with a value of 9.25 (55th percentile). Net margin has seen 6.7% 3-year growth with a value of 6.88 (65th percentile). It is difficult to draw conclusions from these numbers based on the limited data and the large fluctuations over time, which can be seen in the graphs to the right and below. It is promising, however, to see that operating and net margin are currently higher than the median value.

Again, because there is limited data, these trends are not telling on their own, but when thought of in the context



of the growth expectations for the home robot industry and IRBT's own revenue and earnings growth, it is conceivable to think that these margins will continue to increase over time. 3-year return on invested capital is in its 42nd percentile with a value of 22.3%, while WACC is at a historic low of 8.7% thus implying that value is being created. However, given the low cost of capital and the lack of investment mentioned in the growth section, iRobot could create higher returns if they chose to increase costs by investing in new technology and/or new capital.



Relative to its competitors and the appliance industry as a whole, iRobot has a higher net profit margin than the industry and its direct industry competitor, WHR. Although in its 65th percentile, net profit margin for IRBT is

	Industry	IRBT	FANUY	HOLI	ROK	YASKY	ABB	GOOG	WHR	
Net Profit Margin	3.6%	6.88%	25.59%	19.25%	12.58%	5.44%	5.35%	21.18%	3.59%	still significantly lower than its
Operating Margin		9.25%	34.58%	23.76%	18.08%	8.93%	8.49%	25.97%	6.12%	industrial robotics competitors. This

means that less profit is being extracted from its revenue when compared to these other industrial companies. The same can be said regarding the operating margin when again compared to its industrial robotics competitors. In this case, there is less revenue generated after paying for variable costs. These statistics can be found above. Although high historically for IRBT, these lower profitability numbers compared to its competitors can be attributed to the newness of the home robotics market and iRobot as a whole. Additionally, as of yet, iRobot has not seen the same sort of market take-over that has occurred in the industrial robotics industry, making that industry more profitable.



LIQUIDITY, LEVERAGE, AND ACTIVITY

Days inventory, currently with a value of 59.0, is historically high and in its 89th percentile. As can be seen in the table to the right, inventory has increased over the past few years, which is a bit concerning given that iRobot operates in the consumer goods industry. However, given the expected growth numbers for iRobot, increased sales could bring inventory numbers back to lower historic values. As for its debt, iRobot has no long-term debt or current debt liabilities. The current and quick ratios are at historic highs with values of 5.1 and 4.4 respectively. Additionally, as can be seen in the chart to the right, IRBT has ample cash on hand and the ability to easily pay off any debts that arise. Lastly, with the \$100 million stock repurchase program announced this year, one can expect to see a dip in cash in future quarters, but this gives no need for concern given their ability to cover debt.

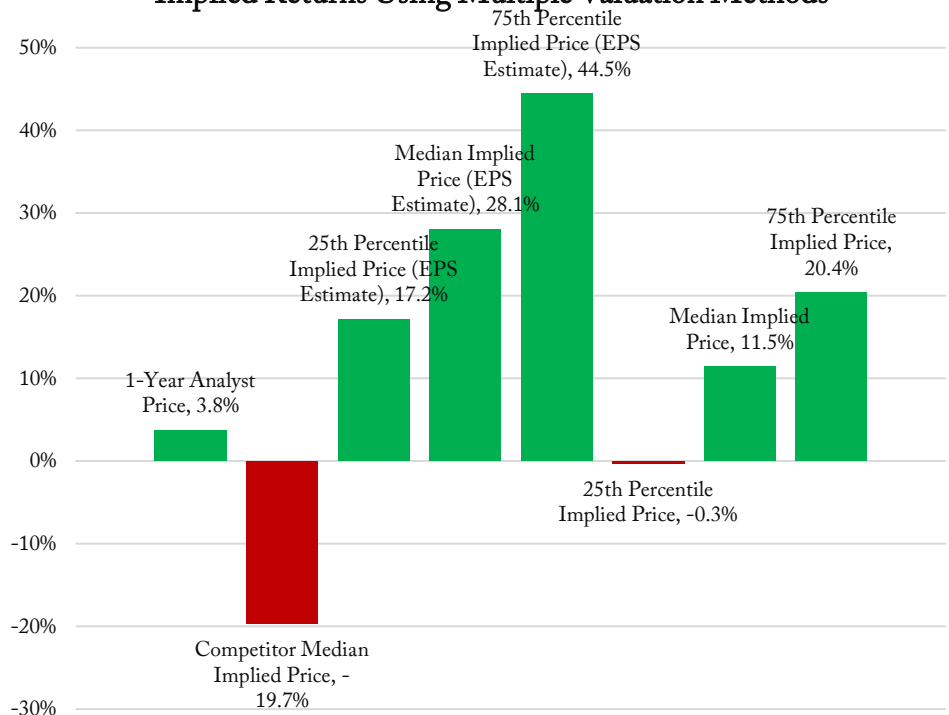
Balance Sheet Statistics (\$thousands)	01/02/16	12/27/14	12/28/13
Cash	179,915	185,957	165,404
Inventory	61,678	47,857	46,107
Short/Current Long-term Debt	—	—	—
Long-term Debt	—	—	—

CONCLUSION

The chart to the right details implied expected returns using the multiple valuation methods discussed above. For example, IRBT is expected to return 3.8% if analyst's consensus price estimate one-year from now is correct.

Considered using median expectations; if iRobot's valuation ratios, such as PE, P/S, P/S, etc. were to reach median historic values, investors would realize a price of \$40.47 and earn an 11.5% return (represented at right by "Median Implied Price"). The same can be seen for valuations using the 25th and 75th historic percentiles (losing -0.3% and gaining 20.4% respectively). Given the current state of IRBT and its valuation below median levels, its recent price of \$36.50 points to an undervalued firm. However, as stated before, given the short history of iRobot, it is difficult to confidently conclude what its true median values would be with a longer history.

Implied Returns Using Multiple Valuation Methods



Turning to competitor valuations implies a price of \$29.16. In this case if iRobot were to equal the average competitor valuations, investor would see a -19.7% return. Again, it is hard to draw a direct comparison here as IRBT's competitors operate outside of its direct industry and have already established themselves in the market.



The chart above also details return expectations based on EPS estimates using the historic 25th, 50th, and 75th percentiles of valuation. These indicate a return anywhere from 17.2% to 44.5% for investors, with a median of 28.1%.

RECOMMENDATION

Although iRobot sees a short data history with limited stability over the long-run, when looked at in conjunction with the positive future growth expectations for iRobot and the home robot industry as a whole, valuations numbers below the more recent median values, high growth numbers, and the relative earnings expectations compared to its industrial robotics competitors, an optimistic investment opportunity seems to take form.

However, at present, Eunoia recommends a **wait-and-see** stance as the potential for iRobot and the home robotics industry as a whole does not quite have such a clear trajectory. Additionally, with the recent sale of their defense and security unit, it is unclear whether profitability and growth will be maintained with a simple consumer robotics line. Perhaps in 6-24 months, when more data is available and trends have become clearer, iRobot will present itself as a great opportunity.