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PTC Inc.: Strong Sell

PTC current stock price - $ 121.83

Stock price forecast for PTC - $49.13

Executive Summary :

PTC is a developer of software based out of Boston, Massachusetts. Its main product lines are Computer Aided Design (CAD) software and Product Lifecycle Management (PLM) software, which make up about 70% of its total revenues. It has four different product lines it puts under its growth product division including an Internet of things (IOT) platform, a Software as a Service (SAAS) CAD product, a SAAS PLM product, and an Augmented Reality (AR) product. The growth products made up 17.1% of its sales as of its recent third fiscal quarter of 2021. Its third division consists of two products that have experienced declining sales levels over the last few years: Application Lifecycle Management (ALM) and Service Lifecycle Management (SLM).

PTC acquired SAAS PLM vendor Arena Solutions for $715 million in January of 2021. PTC's Arena block of business contributed $18 million toward PTC's revenues in its first two quarters under PTC.

PTC made $3.97 on $1.807 billion in revenues for its fiscal 2021 year ending on September 30 th, 2021. It has 116.8 million in shares outstanding.

PTC has $326.5 million in cash, $1.439 billion in debt and $ 2.038 billion in equity as of the recent fourth fiscal quarter of 2021.

PTC gained 43.1% of its revenues from the Americas, 38.6 % of its revenues were from Europe and 18.1% of its revenues were from Asia through the first three fiscal quarters of 2021.

PTC's largest competitors are Dassault , Siemens and Autodesk. PTC also competes with Oracle and SAP in the PLM business. In the IOT business PTC's management claims it competes with Amazon, IBM, Oracle, SAP, Siemens AG, Software AG and GE. For the Augmented Reality business according to PTC's management it competes with Microsoft, Upskill, Ubimax, ScopeAR and Re' Flekt.

PTC's CEO and his management team have used a series of material misstatements over the last several years that in my opinion have violated the anti - fraud provisions section 17(a) of the Securities and Exchange act of 1933 and section 10 (b) of the Securities Exchange act of 1934. The deceptions and misstatements by PTC's CEO in my opinion are very similar to the recent material misstatement cases brought by the SEC against the three well known companies : Theranos, Nikola and Under Armour. Below are bullet points summarizing **just some of the** material misstatements by CEO Jim Heppelmann and his management team.

- At a February of 2019 Goldman Sachs conference CEO Jim Heppelmann said that PTC's growth product IOT was its second biggest business at that point in time and was poised to be its biggest business in about a year. PTC's IOT business in reality was only about third as big as its second largest business at that point in time and has never grown to be any larger than a third of its second largest business.

- On its fourth quarter of fiscal 2018 conference call PTC's management said IOT bookings, which are signed sales contracts, made up 25% of overall bookings in fiscal 2018. In my opinion this was not true as PTC's IOT revenues have never been over 15 % or 16% of total sales after PTC's management made this comment. Bookings should eventually show up in revenue numbers, and revenues for IOT never have come remotely close to making up 25% of PTC total revenues .

- In November of 2019 at PTC's investor day conference the only customer of PTC's newly acquired Onshape to present was a company called Garrett Advancing Motion, a company with $3.4 billion a year in revenues. The spokes person from the company talked about a 99% import rate on transmitting data between its old CAD system and the SAAS CAD product, PTC's Onshape product. My ex- employee and reseller sources have adamantly declared that PTC's Onshape product is not remotely close to being ready to be sold on mass to large customers, and that broad market acceptance by large companies was in general about five years away with one of the biggest vulnerabilities of the SAAS CAD system being porting data over between and new an old systems. According to a source the Garrett sales and installation process took years to complete. PTC's CEO in many instances later admitted the Onshape system wasn't mature enough to be sold to large businesses on a large scale. Heppelmann's comment about this sale to Garrett was," that's the highest end of the tools switching to Onshape". He later added , " that's going to get the attention of a lot of people". Heppelmann was hyping up the capabilities of PTC's SAAS product just like he hyped up its IOT product and almost none of the things he said about IOT ended up coming true.

- On its second fiscal quarter of 2019 conference call PTC's management said that it was achieving low double digit growth rates for bookings for its CAD product, well above CAD market growth rates for the first half of the year. In the very next quarter, PTC's third fiscal quarter of 2019, PTC's management admitted its CAD sales were flat and that its competitor Dassault had about 4% sales increases for the quarter. Bookings are signed sales contracts. How do you vastly outperform your competition for new sales contracts signed for 6 months and then all of a sudden the following quarter bring down forecasts for most metrics and have your stock fall almost 20% in a day ? In my opinion this is another example that CEO Jim Heppelmann's constant claim his company is taking market share is just not true.

- PTC's CEO said PTC's mid - teen growth for its PLM product in fiscal 2020 was partially due to the fact it was taking market share during fiscal 2020. All of PTC's large competitors have vehemently denied to me that PTC is taking market share, and my calls to PTC's own resellers during 2020 indicated the resellers were having sales declines on average of about 14% for my two sets of calls during 2020. PTC just started recognizing 50% to 55% of revenues upfront upon a sale compared to recognizing revenues one month at a time in the year before creating high year - over - year (YOY) comparisons. This is why sales went up mid - teens not because PTC was taking market share.

Investment thesis :

Here is an exact quote from a sales person at one of PTC's largest resellers, " I listen to some of the things they say (meaning PTC's management) and say to myself that is not true". This is what a sales person told me when I called him out of the blue to ask about PTC.

PTC's CEO and its management team in my opinion have made a series of very serious material misstatements about its financial results, how it derived at its results, as well as making material misstatements about the facts about its products. PTC's CEO in my opinion has mislead investors about the market acceptance and capabilities of its two new growth products, Internet of Things (IOT) and its CAD SAAS product. I believe I have proof from discussions with resellers and ex-employees as well as evidence from its financial results that the CEO of PTC has mislead investors.

PTC's management team in my opinion led by its CEO has orchestrated a strategy of trying to claim that its sales growth was from taking market share and the popularity of its growth products when in fact its recent sales growth is the result of a massive change to how it recognizes revenues, starting in fiscal 2020, and its sales growth in fiscal 2018 in my opinion was greatly aided because of the natural mathematical growth rate increase in the fourth year after a transition to a subscription billing method.

PTC's two most important growth product acquisitions of Thingworx and Onshape have proven to be tremendous failures. Discussions with resellers and ex- employees indicates both products are years away from broad market acceptance, and that both products have severe limitations right now to being broadly accepted. PTC's management made slight acknowledgment after the fact recently of some of the limitations of these products after giving misinformation about the two new product capabilities and results on several conference calls.

The reason given for part of the reason why PTC is experiencing such recent high revenue growth rates is that it is taking market share. All of PTC's large competitors disagree that it is taking market share from them. In my opinion this material false explanation as to why it is having high sales growth recently is exactly similar to another well known recent material misstatement case by the management of the well known public company, Under Armour. Under Armour's management was charged and fined by the SEC for saying sales growth was from other various reasons when in fact it was from channel stuffing. In my opinion PTC's CEO saying sales growth was from taking market share when in fact it was from changing how it recognized revenues, and the transition to a subscription billing method is no different than how Under Armour's management mislead investors about how it obtained its sales increase.

All through fiscal 2019 CEO Jim Heppelmann talked about how IOT was a 30% to 40% grower for PTC. In the second and third quarters of fiscal 2021 IOT growth fell to 22% and 17%. And its IOT growth rates in fiscal 2021 would have been lower if PTC wasn't benefitting from being able to recognize a higher amount of revenues right away in 2021 compared to 2018 and 2019 because of an accounting rule change. On its recent fourth fiscal quarter conference call which was about an hour and a half long, IOT was barely mentioned, with management saying IOT bookings missed expectations for the quarter , but, no revenue numbers were given. Almost every PTC reseller I spoke to in the fall of 2018 told me that IOT was not being adopted well at all, and the technology had a host of specific issues that made it years away from being adopted if it ever was adopted, yet, in my opinion Jim Heppelmann mislead investors about how big the IOT business was for PTC during fiscal 2019, and what the potential was for its adoption.

The reality is that PTC gets the lion share of its revenues from two slow growth industries, CAD and PLM, and it's supposed growth products lines are made up of niches in which the given products are really just in a test phase by customers. According to data from market research firms CAD is a 4% growth industry and the PLM industry has 6% growth. And these figures are either from market research firms or investment banking firms that are paid by companies like PTC. These numbers are undoubtedly biased to the upside.

PTC's retained earnings as of the recent third fiscal quarter of 2021 was $121.7 million, and that includes a $363.2 million one - time credit increase to retained earnings in fiscal 2019 because of the adoption of a new revenue recognition accounting standard. Without the $363.2 million one - time gain to retained earnings PTC's retained earnings would have been negative $241.5 million as of the third fiscal quarter of

2021 . PTC went public in 1989. PTC's very poor retained earnings after being in business for approximately 35 years and its very low operating cash flow growth rates over the last 10 to 15 years except for this year are a red flag that it has weak earnings quality, and it is a practitioner of aggressive accounting maneuvers. In PTC's fourth fiscal quarter it didn't break out its retained earnings yet, but, it is important to note that it received about $248 million from one - time tax benefits and a gain on an investment sale that added to its net income and hence added to retained earnings.

PTC is heavily indebted with $1.439 billion in debt, and it just acquired two companies for 47 and 18 times sales that probably won't be contributing to PTC's earnings for years, if ever. PTC's non - GAAP net income results have been well under half of GAAP income results for most years over the last several years. Except for this year PTC has experienced very weak operating cash flow growth rates of low single digits for over a decade. There are numerous red flags that make the sustainability of this year cash flow levels very dubious.

Here is a comment made by Jim Heppelmann in February of 2019 about his 2021 free cash flow projections, "We have a '21 plan and a '23 plan. The '21 plan says that we'll have $585 million of free cash flow and low-30s margins". He later went on to say," It's hard to understand how we get from $230 million of operating profit to $585 million of cash flow in two years. But once you understand the math, it says it wasn't really $230 million because you deferred $255 million".

PTC made $344.1 million in free cash flow in fiscal 2021, and obviously wasn't close to making $585 million in free cash flow. This is just standard fair for CEO Jim Heppelmann. In my opinion he makes the most outrageous prediction you can about future financial projections, and then he just keeps up a relentless stream of misinformation with a new story when he doesn't come close to hitting projections.

And, of course, Heppelmann's many projections and narratives that have not turned out to be true are never questioned by "Street" analysts.

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I. PTC's CEO and its management team make many material misstatements about its products and its financial results in my opinion

Over the last several years in my opinion Jim Heppelmann and his management have made numerous material misstatements about the capabilities and market acceptance of its growth products as well as making material misstatements about the financial results of its product lines and divisions. This section will go over in detail all the material misstatements by Jim Heppelmann and his management team.

Under the Securities and Exchange (SEC) act of 1933 it is deemed illegal for an executive to engage in material misstatements of fact when describing the financial results or financial condition of a public company. To quote SEC director of the Denver office, Kurt Gottschal in the case of Under Armour," **When public companies describe how they achieve financial results they must not misstate any information that is material to investors. The SEC order finds that Under Amour violated the anti - fraud provision of the Securities and Exchange act of 1933."**

The following is a description of the underlying factors in the Under Armour case as described in the SEC's press release on the matter. " The SEC found that Under Amour was not meeting internal sales projections. For 6 consecutive quarters beginning in the third quarter of 2015 Under Armour accelerated or pulled forward a total of $ 408 million in existing orders that customers requested be shipped in future quarters. As stated in the order Under Armor misleadingly attributed its revenue growth during the period to various factors without disclosing to investors material information about the impacts of its pull forward practices".

In this section I will show how in my opinion PTC violated the anti - fraud provisions of the Securities and Exchange acts of 1933 and 1934 just like Under Armour did.

PTC's management has engaged in a multi - year strategy to convince investors that it is a high growth company containing multiple high growth product lines and that its fast growing sales and profits are attributable to its taking market share and the success of its high growth rate product lines. In my opinion the truth is that PTC's high growth products such as IOT and its CAD SAAS product are both not ready to be adopted at even very low levels by its customer base and both suffer from several serious issues that put both technologies years away from a reasonable growth rate levels. In my opinion PTC's CEO and management has not been truthful about the capabilities and the potential for market acceptance by its customer base of these new growth products. PTC's management has also used the change of its billing process and the change in the way its revenues are recognized to cleverly claim it is taking market share while its large competitors are vehemently denying it is taking market share from them.

To understand the motivation behind why Jim Heppelmann has been so willing to give material misstatements in so many instances in my opinion on so many conference calls about the capabilities and sales results about PTC's growth products can be somewhat explained by his comment on one of his investor day conference calls. Here is what he said about how important growth was to him and PTC, " So, I do want you to understand we see ourselves as an ARR growth machine. And that's really the number one mandate of the board and the management team is to turn this company into a high growth company".

Most of the instances of PTC obtaining double digit growth rates for either sales or profits over the last three to four years can in almost all circumstances attributed to the fact that it was coming off very low financial result levels because of its change to a subscription billing method from a perpetual license billing method or from the fact that it simply recognizing much higher revenues upfront when it gets a sale because of the adoption of a new accounting rule.

On February 12 th, 2019 at a Goldman Sachs conference CEO Jim Heppelmann made the following comment, " The IOT business the day we acquired it was our 5th largest business. It is now our second biggest business. And next year probably our biggest business. So we are becoming an IOT company, IOT and AR with a proud heritage in CAD and PLM". In my opinion this is one of the many completely false and outrageous statements at public conferences made by Jim Heppelmann. I have countless statements made by PTC's resellers and ex- employees that adamantly claim that IOT is just in its infancy stages in terms of adoption and that the business case for its adoption is just not there for almost all potential buyers. When Jim Heppelmann made this statement that IOT was its second largest business, which was during the second fiscal quarter of 2019 IOT had made up only 11.2% of its total sales in the immediately preceding year of fiscal 2018, and only ended up making up 13.4% of its business in fiscal 2019. Its second largest business, its PLM business made up 39% of its business in fiscal 2018 and though it didn't break out its CAD and PLM businesses after fiscal 2018 the combination of the two was about the same as it was in previous years in fiscal 2019. IOT wasn't even remotely close to being its second biggest business on February 12 th, 2019. It is also very important to point out that PTC's IOT division's growth rate fell substantially in fiscal 2019 to 26.1% from 34.7% in the previous year, fiscal 2018. So, while Jim Heppelmann was claiming PTC was an IOT company and IOT was its second biggest business it couldn't be further from the truth in my opinion as it growth rate was slowing in its IOT business, and its IOT business was about a third as big as its second largest business, its PLM business.

On PTC's fourth fiscal quarter of 2018 conference call Jim Heppelmann said that IOT made up 25% of its bookings in fiscal 2018. He also said that he expected IOT to surpass PLM and become PTC's second largest business in fiscal 2019. Heppelmann, at the aforementioned Goldman Sachs conference in February of 2019, said that IOT made up about one third of bookings as of that conference in February of 2019. Bookings, which are signed sales contracts should eventually transfer into revenues. How is it possible that IOT bookings made up 25% of total bookings in fiscal 2018, but, IOT sales were only 13.4% of total sales in fiscal 2019 and 15.2% of total sales in fiscal 2020 ? Why didn't sales from its IOT division make up 25% of its total sales in fiscal 2019 if bookings were 25% the previous year? The answer is the bookings number on the fourth fiscal 2018 conference call given by Jim Heppelmann was not true in my opinion .

In the second quarter of fiscal 2019 Jim Heppelmann said that its IOT business had an exceptional quarter and that its IOT business was heading toward outperforming the 30% to 40% growth rates it expected for fiscal 2019. Heppelmann said that its IOT bookings outperformed its CAD business for the first time ever in the second fiscal quarter. Its CAD business is its largest business. He then went on to say that " I expect this to develop into a trend in the coming quarters". IOT deals have very long sales cycles. The deals are even longer than normal as the technology is new and unproven. PTC has to practically give it away at first to get people to test it according to what a reseller told me. The sales funnel is long for a product like IOT. Heppelmann having access to all the prospective customers in the sales pipeline for a product that the company is basically betting the company on would know a great deal about the potential to close deals. For him to say in the second fiscal quarter of 2019 he expects IOT to outsell in the coming quarters its main product line, CAD, which makes up about 35 % to 40% of its business is completely misleading and false in my opinion. As mentioned, for fiscal 2019, IOT ended up being only 13.4% of PTC's total business, while CAD and PLM made up about 35% - 40% of its total business a piece.

The IOT division sales, which PTC describes as its growth division grew 33% in fiscal 2020. The division includes its newly acquired Onshape revenue, Augmented Reality revenues and the newly acquired SAAS PLM revenues. Because Onshape was acquired at the beginning of fiscal

2020 the 33% sales growth figure it achieved in fiscal 2020 is not organic, and not an apples to apples comparison to fiscal 2019. PTC never disclosed what IOT growth rates were for 2020, but, let's just assume they were less than the previous year's 26.1% growth rate, as management heavily pushed the idea that IOT sales were significantly slowed because of COVID -19 in 2020. IOT growth rates were 22% in the second fiscal quarter of 2021 and 17% in the third fiscal quarter of 2021. And its IOT growth rates in fiscal 2021 would have been lower if PTC wasn't benefitting from being able to recognize a higher amount of revenues right away in 2021 compared to 2018 and 2019. A few years back Jim Heppelmann was touting IOT as a perennial 30% to 40% grower. Through 9 months of fiscal 2021 PTC's growth division sales made up 17.1% of total sales.

IOT sales growth rate levels fell in fiscal 2019 before COVID -19 hit. Management is trying to blame the weak growth of its IOT business on COVID-19. The IOT division sales growth fell to 26% in fiscal 2019 from 34.3% in fiscal 2019. The problems with IOT business have been made worse by COVID, but, my research with approximately 25 PTC reseller and ex - employees indicated the problems for the adoption of IOT are immense, and IOT is not even remotely close to realizing any traction with even a modest level of real live paying customers. The difference between what Jim Heppelmann and the management team at PTC were saying about the adoption of IOT with what resellers and ex- employees were saying about the adoption of IOT was so astounding it was like Jim Heppelmann and the resellers weren't even talking about the same product.

IOT is a network of physical objects that are embedded with sensors, software and other technologies for the purpose of connecting and exchanging data with other devices and systems over the internet. The devices range from kitchen devices to cars to thermostats. A typical manufacturing IOT application would be for a company to be able to know in advance of a machine was about to break down.

An employee from PTC's largest reseller about 3 years ago told me that IOT was just being used on a limited basis, and that potential customers were just testing to see if there was a business case to use it. This was right when Jim Heppelmann was claiming that IOT made up 25% of its bookings in the previous year, and was about to become its second largest business. Other resellers and ex- employees over the course of the last 3 years have told me that IOT was a lot of "hype", it is a solution looking for a problem, it is in its infancy stages, there are problems with IOT during the proof of concept (POC) process, IOT is 10 years away from being adopted to any degree, there are too many problems integrating IOT with existing systems and processes, too many sales people and support people are needed to sell and install IOT, there is no business case to IOT, IOT is too expensive, customers are hesitant to invest their money in IOT, IOT has to be proven to invest money in it, IOT has only progressed very slightly, there is no progress with IOT from a year ago, PTC is practically giving IOT away to get customers to use it, IOT is not real time yet, there is no real traction with IOT, and there is resistance against IOT. One ex-employee told me that IOT is now gaining more traction because companies have less workers after COVID -19 and that more businesses are moving forward with their IOT projects.

There are a massive amount of problems or potential problems that customers have to deal with when they deploy a IOT platform in their business that Jim Heppelmann and his management team have failed to disclose to investors. When you install an IOT platform and it integrates with existing equipment and infrastructure there is a big concern that you will affect your OSHA certification when IOT is deployed. There is also the potential for problems with insurance coverage when IOT is deployed.

One ex- employee of PTC explained to me that IOT at the current time is a massive money loser for companies to use and deploy. The return on investment is years away and there may never be a positive return on investment. His comment was that you spend $20 to fix a problem that should cost $1. He told me the resources and money required to set up just one factory on IOT is absolutely mammoth.

The above mentioned ex- employee also told me that no one really knows how to sell IOT. It is a very complex selling process. And you can see this in PTC's recent results for IOT. Its year-over - year (YOY) sales growth fell to 22% and 17% the last two quarters. And management has acknowledged churn is up as well for IOT, which is kind of surprising given it is such a new product. But, I am sure businesses are getting it into their buildings and leaning that the product really provides no real defined value and a lot of headaches.

The negative responses from PTC's very own resellers and its ex-employees about the adoption levels for IOT were overwhelming. Jim Heppelmann was claiming in February of 2019 at the Goldman Sachs conference that PTC was an IOT and AR company, and that IOT was PTC's second largest business. He claimed in the second fiscal quarter of fiscal 2019 that for the first time PTC had higher bookings for IOT than CAD, and that he expected that trend to continue. Jim Heppelmann's descriptions of how big IOT was and how well it was being accepted was not true in my opinion throughout fiscal 2018 and fiscal 2019. The results for IOT prove that Heppelmann's statements about IOT during fiscal 2018 and fiscal 2019 were not true in my opinion. And the statements made by many of his own resellers and ex- employees about the real adoption rates are consistent with what the actual results for the adoption of IOT actually are.

PTC's management has been highly touting the fact that CAD delivered via SAAS is the future, and that PTC will make twice the amount of revenues per customer on a SAAS CAD sale versus the revenues it made on the old style desktop based CAD system.

Jim Heppelmann has alternated at various times between giving examples of large companies that are buying and benefitting from its new CAD SAAS product to saying it is mostly right now suitable for only small businesses.

Heppelmann came right out of the gate after the Onshape acquisition hyping Onshape and its potential and used a very large company with $3.4 billion a year in revenues as an example of an Onshape customer at its 2019 investor day conference shortly after the acquisition.

An ex - employee of Onshape and PTC told me that the Onshape acquisition was a complete catastrophe for PTC. He said that out of 6 enterprise sales people 3 had left the company when he was there. He told me that none of the enterprise sales people made quota. He said that as soon as the buyers learned how difficult the process was of porting their data from their old CAD system to the Onshape SAAS product that almost all immediately backed off. He said even excluding large enterprise sales overall sales for the Onshape product were very poor. He even cited the company with $3.4 billion in revenues, which he obviously knew about and said there was a slow "ramp up".

Another ex - Onshape employee told me the sales and installation set up process takes about 40 meetings between the seller and the buyer of Onshape if it was selling to a large company. He told me that before PTC bought Onshape he was just setting up meetings to go over the CAD SAAS concept if it was a large company. He said that the sales meetings were set up as more of an educational meeting than a sales meeting for large companies. He told me that when PTC bought Onshape right away there was a push by PTC's sales managers to get companies to try 3 to 4 seats of Onshape, and then to upgrade them to many more seats later on. He said that this strategy was a complete failure. He told me that because of the way the Onshape system was set up technically you can't just try it out with a few seats, and have it integrate with the existing desktop CAD system in place without issues. The ex- employee told me that there are many technical issues with the Onshape system. The ex - employee said eventually SAAS CAD would be adopted, but, it was 4 to 5 years away from being ready for prime time to be sold and used as a viable system to large companies. He said that PTC's management put quotas in place for Onshape sales people and that nobody was hitting their quotas. He said that Onshape was an early stage venture start up and wasn't close to being what PTC's management thought it was. He just thought it was ridiculous that PTC's management was trying to set up a sales strategy and setting up quotas for selling Onshape when the product was really just in the test and concept phase.

PTC's management claimed that it had 1,000 new sales for its Onshape product in fiscal 2021. Based on my discussions with the ex - Onshape employees and their descriptions of the state of the Onshape product and its suitability for real time use in a normal business environment this figure sounds very farfetched and really just completely not believable.

On PTC's third quarter of fiscal 2021 conference call Jim Heppelmann said that PTC had reached out to its Windchill and Creo customers, which are its PLM and CAD product customers to test their receptivity toward SAAS, and that their receptivity toward SAAS expanded dramatically over the last year. His words were" I mean, like from a minority to a very strong majority of them say I want SAAS". The majority of PTC's revenues for its CAD and PLM are from large companies. For Jim Heppelmenn to get on a conference call and say that these large companies want SAAS when it is known and proven that PTC's CAD SAAS product is not anywhere near being ready for large companies, and that there are major installation issues and major technical challenges to deploying and using the product is outrageous, and I do not believe it is true that most of PTC's customers said I want "SAAS" based on my researching the adoption issues of this product.

I spoke at length with a PTC reseller who was also a Dassault reseller about how relevant he thought PTC's CAD SAAS product was in the CAD market right now and his concern was what type of infrastructure you would have to have in place to reliably use a CAD SAAS product. He said he thought PTC's Onshape product was 5 years away from broad acceptance.

On November 25 th 2019 PTC held an investor day conference. Part of the discussions that day were about PTC's recent acquisition of SAAS - CAD company, Onshape. One of the speakers at the conference was an employee of the company, Garrett Advancing Motion, a company with $3.4 billion in annual revenues. The employee described the installation process of the Onshape product as "pretty successful" and "pretty flawless". The employee said that his company was importing over 40,000 parts into our production environment over the last couple of days, and we had a 99% import rate.

PTC had just paid $470 million for Onshape. There were obviously some that questioned the fact that PTC paid 47 times sales for Onshape

Here is what Heppelmann said during that conference after the speech by the employee of Garrett. " I think, hopefully, it's not lost on you that example from Garrett, that's a CATIA customer. That's the highest end of the tools switching to Onshape and declaring it to meet use cases minimum viable product getting better quickly. So, to me , when a company like Garrett switches for the reasons outlined, which have to do with business benefits on one hand, and cost savings on the other hand. I think that is going to get the attention of a lot of people."

The fact that PTC and Heppelmann used Garrett a $3.4 billion a year company as the one customer example for the Onshape product at this conference is very disingenuous. It took 4 years for Onshape to sell and install its product into Garrett facilities. It is a known fact that the Onshape product is not close to being "mature "enough to be adopted on mass to a companies the size of Garrett. Heppelmann has admitted as much over the last year until just recently, yet, he was touting the fact a company the size of Garrett was switching to Onshape at its investor day conference. The employee at Onshape also touted the ease of transition of the porting the data over to the Onshape product when it is a known fact that this is one of the biggest reasons why large companies won't touch the Onshape product.

In my opinion it is outright misleading at its "Investor " day conference that Jim Heppelmann would be using a $3.4 billion a year company as an example of an Onshape customer when it was known that the Onshape product wasn't ready for large customers in general in my opinion, and then for PTC to have the employee of the customer example emphasize the ease in switching over the data is shameless in my view when it is a known fact that this is a very big problem.

There was no mention of what the acquired Onshape revenues were in any of PTC's 10Q's or 10K's all during the year after PTC acquired it. The only actual mentions of any types of results for the Onshape acquired revenues was during the fiscal fourth quarter conference call when PTC management said that Onshape bookings were up over 80%. In another quarter PTC's management on a call said that its Onshape acquired business had ARR growth of 40%YOY.

Management also on one of its conference calls said that Onshape is stealing large accounts, and that it was stealing the large accounts from Dassault's for its Solidworks product. Management went on to say that PTC'S Onshape product was getting business from recognizable brand named companies. From my discussions with the Onshape ex- employees they was adamant that Onshape was getting almost no sales amongst large businesses. This claim from PTC's management that it was stealing large accounts is probably not true. Interestingly enough later on this same call PTC's executive says that Onshape needs to mature before it will really be a viable replacement for a high end product.

In the third fiscal quarter of 2021 Jim Heppelmann said on the conference call that PTC had a very strong quarter in its Onshape business for commercial business with large deal sizes and strong renewals thanks to a maturing product.

To get large deal sizes you have to sell large customers. It has been established as a fact based on my discussions with ex - employees of Onshape that PTC's Onshape product is not even close to being ready to be sold on a regular basis to large companies. Just the installation process and the potential major problems porting over data from the old CAD system to the new SAAS system scares away most potential customers. It is incredible that Jim Hepplemann still persists trying to convince in investors that the Onshape is a commercially viable product to be sold to large customers.

II**. PTC management's claim that growth is coming from stealing market share and the sales success of high growth products is not true in my opinion**

In my opinion Jim Heppelmann and his management team over the last several years have made several material misstatements about how and why it is achieving its growth. This section will explain how in my opinion Jim Heppelmann and his management team have been misleading investors as to how PTC derived at its growth over the last several years.

PTC over the course of the last approximate three years has claimed it is taking market share for its two largest product lines, CAD and PLM and on some occasions just for PLM or CAD. Management has also said that high sales growth has come from its new high growth products such as IOT and Augmented Reality. I have been in touch with three of PTC's largest competitors and they all vehemently deny that PTC is taking market share. In a recent Dassault conference call its CEO went on record to say that it is winning against PTC in direct competitive bids over 85% of the time. Siemens' investor relations director told me that it might seem like

PTC might be taking market share because its sales growth came as the result of it changing to a subscription model, and the fact that at the early stages of the change revenues are deferred creating a decline in sales that in later years are made up. The Siemens' representative told me that PTC is not taking market share from Siemens. Autodesk management also told me that PTC is not taking market share from it according to the data it looks at. PTC's management made the claim that it experienced 14% sales growth for its PLM product in fiscal 2020 during COVID-19 while the rest of the market was flat. PLM is a very complex expensive software platform. PTC sells PLM to industrial companies, medical device companies, aerospace companies, auto companies and government agencies. It seems to be beyond the realm of possibility that PTC had 14% sales growth selling high end software to large companies during COVID-19 if it wasn't benefitting from being able to recognize over 50% of the revenues on subscription contracts upfront compared to the previous year when it was only recognizing revenues upon the passing of one month intervals.

My survey calls with PTC's own resellers in 2020 and 2021 indicated overall on average over the 2 year period sales were down very low single digits for the resellers. There is just a huge disparity between PTC's sales results and its own resellers, which is because PTC is now recognizing 55% of its revenues right away compared to the past where it recognized revenues ratably. The resellers are more of a true barometer of general sales levels because they were giving results for the given period without an accounting change. The resellers sales results in 2020 and 2021 contradict PTC's management's theory it is taking market share.

On PTC's second fiscal quarter conference call of 2019 PTC's management said that bookings for its CAD product for the first half of the year were up low double digits well above CAD market growth rates for the first half of the year.

On PTC's very next quarter, on its third fiscal quarter conference call, in July of 2019, while management was being questioned by "Street" analysts about why its quarter was so poor one of the analysts asked about what PTC's management thought about Dassault's management earlier in that particular day saying it was taking market share. PTC's management acknowledged its CAD sales didn't grow or were flat and that Dassault's CAD sales were up 4%. PTC's manager went on to down play the relevance of Dassault having higher CAD sales than PTC. Bookings being signed sales contracts should be a precursor and indicator of future sales levels. How do you go from significantly outperforming your competition for signed sales contracts for 6 months, and then all of a sudden the immediate following quarter have a terrible sales performance including lower sales levels than your competition ?

The reality is that PTC adopted the new accounting revenue recognition rule ASC 606 in October of 2018, but, in the first year it didn't immediately recognize the above 50% of upfront contract revenues that ASC 606 allowed. Part of the reason it didn't recognize over 50% of the subscription contracts right away is because it was selling some of its software via cancelable contracts, so that it couldn't count more than one year of a subscription contracts right away.

At the end of fiscal 2019 PTC stopped selling cancelable subscription contracts, which allowed it to start to recognize 50% to 55 % of multi - year contracts upfront starting in fiscal 2020. So, for example, when before fiscal 2020 it recognized revenue ratably a month at a time, now it could for a two year contract count half of the entire contract right away. It is easy to see why PTC had such large jumps in revenue right in the middle of COVID-19 lockdowns during fiscal 2020. In the second quarter of 2020, PTC's third fiscal quarter, when the rest of the industrial companies in the U.S. were experiencing large sales declines of up to 20% PTC had 19% sales increases. In October of 2020 at the beginning of fiscal 2021 PTC changed to recognize 55% of revenues upfront, which is higher than the 50"% to 55% it recognized in the previous year. Most of these increases to sales for PTC are from accounting changes and not from actual sales changes.

PTC's management seized upon its outsized sales gains in fiscal 2020 that were merely the result of an accounting change resulting in it recognizing much more in revenues upfront than the previous year to make the claim it was taking market share. This claim is not true in my opinion .

The actual performance of PTC's growth divisions product lines contradict PTC's managements assertion that its growth is partially because of its growth products.

PTC's IOT business growth has fell from 34.7% in fiscal 2018 down to 26.1% in fiscal 2019. PTC's management never said what its IOT growth rate was in fiscal 2020 besides saying it wasn't good because of COVID -19. PTC's IOT division growth fell to 22% and 17% for the second and third fiscal quarters of fiscal 2021, and PTC's management said IOT missed its booking expectations in the fourth fiscal quarter, but didn't elaborate on it sales results. PTC's growth division made up only 17.1% of total sales for the first 9 months of 2021. Its growth division made up 13.4 % of sales in fiscal 2019. It spent over $1 billion on two acquisitions between since the end of fiscal 2019 and its growth division only increased its total percentage of sales from 13.4% to 17.1% between fiscal 2019 and fiscal 2021. PTC's management has never given revenue results for its Onshape acquired business since acquiring it. I know from talking to ex-employees that PTC's Onshape business has tremendously underperformed what PTC's management expected, and sales levels for its Onshape product have been very weak. Through 9 months of fiscal 2021 PTC experienced about 20 % organic growth from its growth businesses. This is very weak growth when you consider Onshape just generated about $10 million in sales before PTC acquired them. Most successful software companies at the stage of where PTC's IOT and SAAS products are deliver well over 30% sales growth. You would expect that once the Onshape product was being sold by PTC's huge sales force and sales channel Onshape sales would be strong coming off such a low base of sales. This has not happened. PTC's growth division is very small and very unprofitable. PTC's sales growth in fiscal 2020 and fiscal 2021 did not come from a strong performance from its growth division. Its two major growth initiatives IOT and CAD SAAS have performed very poorly.

During 2019 PTC's stock fell from $ 81.96 on January 2 nd, 2019 down to $ 74.89 on December 31 st, 2019. It was one of the only public software companies in the U.S. to have its stock fall for the year. The NASDAQ exchange, made up of mostly technology companies, grew about 35% in 2019. PTC's management had forecasted it would make between $ 255 million and $265 million in free cash flow for the year in 2019 and it ended up making $ 221 million in free cash flow. It also lowered revenue and earnings guidance during the year. On PTC's fiscal third quarter of 2019 conference call it lowered guidance for all of its metrics and its stock fell over 15 % in a day. As mentioned on the third quarter call of fiscal 2019 it was brought up how Dassault was taking market share from PTC. PTC's management brushed the assertion aside and said that Dassault was only taking a little bit of market share from PTC at the time. So, during fiscal 2019 when PTC was recognizing revenues ratably there was tangible evidence brought up on a conference call that PTC was losing market share. In fiscal 2020 after PTC shifted to recognizing 50% to 55% of revenues upfront its management really started to push the taking market share theory. PTC's management also pushed the taking market share theory in fiscal 2018, which I will explain later in the paper why it was mentioning taking market share in fiscal 2018. PTC's big emphasis on taking market share accelerated in fiscal 2020 exactly when it started to recognize 50% to 55% of revenues upfront.

PTC's management in its 10 Q's makes mention of the fact that it has experienced sales increases when existing customers switch from maintenance contracts associated with perpetual licenses to subscription contracts. PTC's management has made about one passing reference to the sales boost from this sales process on its conference calls. Sales from switching maintenance contracts to subscription contracts have made up a high amount of PTC's subscription sales over the last several years. PTC's management has made its maintenance customers agree to three year contracts to be able to switch to a subscription, and it of course recognizes 55% of the three years of maintenance contracts right away. So, a former maintenance contract becomes a big one time sales hit for PTC because it is recognizing 55% of a 36 month contracts upfront if it sells a three year deal. Switching maintenance contracts to subscription contracts will not go on forever as eventually it will run through the complete list of maintenance contract customers that are willing to switch to a subscription. PTC's management also has stated right at the same time it started to recognize 50% to 55% of revenues upfront that it would start to sell longer term contracts. What was interesting about it saying it was going to sell longer term contracts was that it was getting rid of its cancelable contracts. You would think that it would be easier to sell longer term contracts if the customer could cancel the contract. Not the opposite. Of course longer term contracts become in great demand when you can recognize 55% of revenues upfront.

III. PTC's new announcement on accelerating customers transition to SAAS; PTC's CEO doubles down on making promises he can't keep in my opinion

On PTC's fourth quarter of 2021 conference call CEO Jim Heppelmann laid out a strategy of accelerating PTC's plan to transition it's large customer base to using a SAAS platform with new orders starting at the end of fiscal 2022. Previously after realizing that its acquired Onshape SAAS product wasn't ready or mature enough for large businesses Heppelmann had backed off initial his hype around Onshape and said the accelerated roll of SAAS for large customers wouldn't start on a large scale until 2024.

I have explained in detail in the preceding sections how my ex- employee sources emphatically declared that PTC's Onshape product had numerous technical issues including a major issue of safely porting over data from the old desktop CAD system to the new SAAS system. My sources said that the adoption of CAD by large customers was in general about 5 years away.

Jim Heppelmann would be very aware of how long it will take for a CAD SAAS system to be adopted on a very large scale by large customers. Yet, in my opinion, he is again deceiving investors, and saying through investments PTC is going to make CAD SAAS ready to be deployed on mass to large customers starting at the end of 2022.

And why wouldn't he continue the same strategy of telling stories that in my opinion won't come true ? It worked before when he gave misinformation in my opinion about his customers acceptance and product readiness for years about IOT, and not one of the "Street" analysts who cover PTC said nearly a word about the fact that sales growth rates were rapidly slowing for IOT and how none of his promises about his company becoming an IOT company were true. PTC's stock has climbed via Heppelmann's constant shifting story of what PTC is all about and his management teams crafty use of aggressive accounting maneuvers.

To show how brazen and reckless PTC's management is PTC's CEO and CFO explained that while the company was making this large investment in getting its SAAS products ready to be deployed on mass to large customers at the end of 2022 PTC would reduce spending by approximately $60 million in 2022 compared to 2021. The fact that it is a massive effort to make SAAS ready to be used safely by large businesses and not only is PTC's management says it is going to do it in faster than everyone in the industry thinks is possible, but they are going to reduce spending at the same time is preposterous in my opinion.

Management announced on its fourth fiscal quarter conference call that it be would taking yet another restructuring charge of a range of $45 million to $ 50 million to lower expenses during this time of heavy investment.

IV. PTC's 2021 operating cash flow results as a predictor of future operating cash flow flash warnings signals

PTC's strong and unusually high operating cash flow in fiscal 2021 raises red flags as to the sustainability of current cash flow levels as an important line item shows a very unusual characteristic and PTC benefitted from one - time gains that will not be repeatable in the future.

As has been pointed out in October of 2019 PTC started to recognize 50% to 55% of its total subscription contract value right away compared to previous years when it only recognized revenues ratably one month at a time. This had the effect of greatly increasing sales and earnings results at much higher sales growth rates in fiscal 2020 and fiscal 2021 than it had experienced in a very long time. PTC's management told investors that because of the adoption of ASC 606 the income statement had more volatility, and less predictability as a determinant of financial results so investors should consider both ARR and free cash flow more than income when analyzing PTC' results. PTC's CFO emphasized that cash flow would not change as a result of the change to ASC 606 only the income statement would change. If you think about it, however, in most cases, by far and away the most important line item on each operating cash flow statement is GAAP net income as it usually, but, not always represents the highest amount of all the line items on the operating cash flow statement . So, if GAAP net income is usually the most influential line item on the operating cash flow then of course having GAAP net income at much higher levels because of the switch to ASC 606 will greatly increase operating cash flow unless another line item will offset the outsized gains in GAAP net income realized because of the switch to ASC 606.

The line item that should offset the ASC 606 induced large, artificially high GAAP net income at the top of the operating cash flow statement should be deferred revenues, as, the given company that just switched to use ASC 606 to recognize revenues should be deferring much less revenues. The reason being simply if you are recognizing a much higher percentage of revenues upfront, which PTC is, you are deferring much less revenues. So, deferring much less revenues means the liability line item deferred revenues should go down, which would mean lower cash flow as a liability going down decreases operating cash flow. But, this is not what has happened at PTC in fiscal 2021. Its deferred revenues went up 18%, 18%, 17 and 17.1% and its revenues went up 20.4%, 28.5%,23 % and 23 % in fiscal 2021. **See Exhibit 1**. Compare this to fiscal 2020 when PTC's deferred revenues went up 9.1%, 6.5%, 5.8% and 7.5% and its revenues went up 6.5% 23%,15% and 20.4%. In fiscal 2020, in three of the four quarters quarter its revenues went up much higher than its deferred revenues, and its operating cash flow ended up the year at $233.8 million. This year, for all four quarters its deferred revenues went up high teens and its operating cash flow it ended up being much higher in fiscal 2021 at $368.8 million versus $233.8 million in fiscal 2020. The line item deferred revenues on PTC's operating cash flow showed a positive contribution of $ 58.7 million contribution in fiscal 2021, a huge positive for its operating cash flow that just doesn't make sense given how much revenues it is recognizing right away upon each sale. A deferred revenue offset to the large gains PTC benefitted from the ASC 606 switch should be happening. But it is not. It makes no sense that PTC's deferred revenues have grown so much this year when it is deferring so much less than before it switched to ASC 606.

Exhibit 1

Deferred Revenues

PTC - Fiscal 2019 - fiscal 2021

*** in millions**

Year /Quarter	Deferred Revenues - current * in millions	non- current
Q-3-2021	$460.80	$12.77
Q-2-2021	480.8	11.5
Q-1-2021	424.7	9.3
Q-4-2020	416.8	9.6
Q-3-2020	395.8	8.8
Q-2-2020	407.4	9.7
Q-1-2020	359.4	8.5
Q-4-2019	385.5	11.1
Q-3-2019	374.2	8.2
Q-2-2019	381.3	10.4
Q-1-2019	325.1	10.1

As an example of why PTC's deferred revenues seem so high for the type of company it is and how it recognizes revenues, PTC's total deferred revenues as a percent of its total assets were 11% as of its most recent quarter, the fourth fiscal quarter of 2021 compared to the same data point that was much lower for two similar type companies to PTC : Ansys and Aspen Technology. Ansys' total deferred revenues as a percent of total assets were 5.3% as of it most recent quarter and Aspen Technologies' total deferred revenues were 4.1% as a percent of total assets as of its most recent quarter. Comparing balance sheet line items as a percent of total assets is a common practice amongst forensic accountants. Both Aspen and Ansys recognize a high percentage of its total subscription contracts upfront just like PTC.

PTC's operating cash flow fell to $233.8 million in fiscal 2020 from $285.1 million in fiscal 2019. Management had previously as recently as fiscal 2019 forecasted $585 million in free cash flow for fiscal 2021, this year. As mentioned PTC's made $368.8 million in operating cash flow in fiscal 2021. PTC has had several one - time type benefits to its cash flow this year through the first three quarters to offset a $17.5 million payment it made to the government of South Korea for a tax settlement on a tax dispute. It reduced and released a tax valuation allowance reserve by $42.3 million in fiscal 2021 through three quarters, which greatly helped GAAP net income, which of course is the top line of the cash flow statement. This is in comparison to last year through three quarters when it released only $21.2 million of a tax valuation allowance into GAAP net income. So, it had double the benefit this year for its cash flow compared to last year from tax valuation reserve reversals through three quarters . This year, in 2021, so far it has paid about $14 million less in restructuring cash payments and acquisition related cash payments than it made last year through three quarters. PTC also made an acquisition of a company called Arena in the second fiscal quarter, and there are working capital tricks that can be used after an acquisition to improve operating cash flow in the first year after the acquisition.

V. PTC's revenue growth is a complete mirage; The truth about PTC's real revenue growth

This section will go over in detail how PTC's has used billing and accounting rule changes to show revenue growth when in fact calls to PTC's own resellers indicate PTC's real sales growth rate levels are actually very low.

Revenues are one of the most important metrics in which to judge the success of a public software company. It should be a relatively straight forward process to figure out what revenues are for a company. Take each individual sale and add them all up during the course of whatever of period you are trying to judge and you get revenues.

In my opinion PTC's management and other software companies' management have purposely made trying to figure out what exactly its revenues are a very difficult task, and have made trying to do apples to apples YOY revenue comparisons very difficult as well.

PTC's management obfuscation of what revenues actually are started in fiscal 2014, which was in October of 2014 when PTC started to sell its software via a subscription billing method instead of by the previous method it used, selling perpetual licenses. The subscription billing method entails a customer being billed per seat per year for as long as the customer uses the product. PTC's average contracts are approximately 2 years. This was in comparison to the perpetual software license method of billing in which the customer paid upfront for and owned the software license, and had the option to pay maintenance on the perpetual license, which was usually around 20% of the upfront cost per year. Because in the initial stages of the transfer to a subscription billing method software companies recognize less revenues than with the previous billing method when it sold perpetual licenses you can't do an apples to apple comparison with previous years in the first few years of the switch.

PTC's management claimed it would take 4 years after the change to the subscription method to be able to do an apples to apples revenue comparison because you have to account for maintenance revenues. Because PTC wasn't being held accountable to show revenue growth after the switch to selling via a subscription management was able to point toward its own set of non - Generally Accepted Accounting Practice (GAAP) metrics such as annual run rate (ARR) or bookings to judge sales. Investment banking analysts warmly received PTC's managements new way of describing results. It allowed them to tout PTC's investment growth story without the inconvenience of having PTC show a steady growth in earnings and sales every quarter . Because no one really knew what revenues should be after the switch to the subscription billing method management got to control the narrative using different non- GAAP metrics such as ARR and bookings to describe its results. Expectations were low and as long as management told a good story the investment banking analysts went along. PTC's stock rose about 280% from

January 1st, 2016 to the end of October of 2018. This was all during the 4 year period when PTC's management convinced "Street " analysts and investors that that GAAP and GAAP net income revenues didn't matter.

It is also important to note that Jim Hepplemann, PTC's CEO said on conference calls that PTC was taking market share in fiscal 2018. Here is Jim Hepplemann's comment on PTC taking market share on PTC's fourth fiscal quarter of 2018 conference call," Looking back over the past two years, CAD has delivered a bookings growth CAGR in the high single-digits while outpacing overall CAD market growth rates and well ahead of the lower single-digit growth assumptions built into our long range targets ".

PTC had 6.6% revenue growth in fiscal 2018. It is a known mathematical fact that during the first few years of a switch to a subscription billing method a company will experience lower revenues than previous years because the per year charge for a subscription software contract is less than the what the given software company received from selling a perpetual software license in the previous year so in the first few years a company going through a subscription transition is going to have lower revenues than previous years when the perpetual billing method was being used. And this is exactly what happened at PTC as it experienced sequentially lower revenues in fiscal 2015 and fiscal 2016. After 3 or 4 years as more customers renew contracts that signed on in the first few years of the switch are added together with the new customers who are signing to new subscription contracts, revenues grow compared to the first few years of the transition. So, there is a natural, mathematical higher than normal growth that happens in the third and fourth years of a transition to selling via a subscription contracts compared to the first few years of the transition as a result of the transition to a subscription billing method that had nothing to do with taking market share or growth through an expanding market. Jim Heppleman actually tries to claim it was taking market share in fiscal 2018 as he seized upon the growth that only was happening as a result of the subscription transition in my opinion to try to claim that PTC was taking market share. This claim of taking market share should have been immediately questioned by "Street" analysts, but, it wasn't. The " Street" analysts went right along with this ridiculous narrative that PTC was taking market share in fiscal 2018.

Interestingly enough right around the period when the four year period of not having to worry about revenues and earnings results ended PTC's stock experienced significant underperformance as its stock fell from $81.92 on January 2nd, 2019 down to $74.89 on December 31 st, 2019. PTC started to miss earnings estimates and lowering future guidance almost exactly on the four year anniversary of when it started to sell via subscriptions. During 2019, when PTC's stock fell 8.5% the Nasdaq exchange went up about 35% PTC was one of the only public software companies in the U.S. that had its stock fall in 2019.

PTC's revenue went up 7.1%, 2.4%, 2.5% and 10.4% YOY in the four quarters of fiscal 2019, very low growth rates for a very high priced supposed growth company.

On October 1st, 2018 PTC started to recognizing revenues according to the new revenue recognition rule ASC 606. But, for some strange reason it didn't realize the revenue benefit of being allowed to recognize over 50% of the total value of its subscription contracts upfront right away during fiscal 2019 that are allowed because of ASC 606. Management instead decided to increase its retained earnings by a net gain of $363.2 million in fiscal 2019 instead of showing the increased revenue recognition benefits that happen on ones income statement upon the transfer to using the new ASC 606 method of recognizing revenues. As mentioned in an earlier part of this report part of the reason PTC didn't recognize revenues right away when it could have might have been the fact it was selling cancelable contracts in fiscal 2019.

During the first 3 quarters of fiscal 2019 PTC was offering customers the ability to cancel contracts if they so chose. Because it was allowing customers the right to cancel it couldn't recognize revenues after the first year on multi - year contracts. Based on my reading on the rules on revenue recognition past and present one of the core concepts is that to recognize a sale the customer must accept the product unconditionally and agree to payments terms to recognize the sale unless a return reserve is set up. I did not read about a return reserve in PTC's 2019 10K. PTC decided to end its policy of selling subscription contracts with the right to cancel in the fourth quarter of fiscal 2019.

In fiscal 2020 PTC started to recognize 50% to 55% of revenues on a subscription contract right away, which means if it was a 3 year contract and worth $1,500 per year it would recognize $2,250 right away. It is easy to see it you are comparing recognizing 18 months of a 3 year contract right away in one quarter how you may get large jumps in sales growth when you are comparing recognizing 18 months versus recognizing 3 months right away, which is how many months you would recognize right away if it was signed the first month of a quarter when revenues were recognized under 605. As a result PTC had 19% YOY sales growth in the third fiscal quarter of 2020 and 16.7% YOY sales growth in the fourth fiscal quarter of 2020 right during the period in which companies were experiencing the most dramatic sales declines because of COVID-19 and the forced shut downs of businesses.

I spoke with 6 PTC resellers in July of 2020 and asked them to compare sales results for May and June of 2020 with May and June of 2019. The average YOY change was down 19.6%. The average change when I asked 8 PTC resellers to compare August and September of 2020 sales with August of 2019 sales was down 7.8%. These two above referenced surveys are in comparison to calls I made to 6 PTC resellers between June and August of 2021 and asked them to compare YOY sales changes in the two previous months and the average change was up 10% YOY. You obviously would expect a healthy amount of increase for resellers during the summer of 2021 compared to the previous summer when COVID -19 was shutting down the country. But, 10% is not that much of an increase when you consider resellers experienced 19.6% declines in my July of 2020 survey.

In PTC's recent third fiscal quarter of 2021 PTC experienced 19.4% YOY sales increases. Given that PTC's management claims that its average subscription contract is 2 years and this is the second year after it started to recognize over 50% of subscription contracts upfront you would expect the second year growth to be higher than normal because you have a whole other year of new contracts to be compared to when the same contracts were being recognized ratably. One would expect 2 years of higher than normal sales growth because the average length of a PTC subscription contracts is 2 years. But, now stating in the first quarter of fiscal 2022 most of the contracts have already gone through the cycle of having its revenue recognized upfront so that the large increases experienced the last 2 years will be gone. The last 2 years of large sales increases for PTC are strictly because it changed to recognizing more than 50% of revenues upfront compared to previous contracts where sales were recognizing ratably.

It is also important to consider the fact that PTC increased the amount it was recognizing upfront on subscription contracts to 55% as of its most recent 10K, which came out in November of 2020 compared to the 50% to 55% its management said it was recognizing as of its previous 10K, which came out in November of 2019. So, PTC experienced higher YOY increases per sale merely because its management decided to recognize more upfront than the previous year.

PTC's management stated at an investment conference in September of 2019 that according to industry analysts the CAD industry was a 4% grower and the PLM industry was a 6% grower. In various conference calls with investors PTC's management has acknowledged that the CAD industry is a mid single digit growth industry.

Now because of the transition to selling via a subscription model some software companies such as Adobe have experienced higher revenues because of the fact that subscription software contracts are more expensive for the end user if the end user keeps renewing the subscription for more than 4 years. For the subscription growth strategy to work renewals must be strong. For PTC 2019 is the benchmark year to look at for whether its transition to a subscription billing method was working as it was the fifth year from when it started to bill visa subscriptions. And it was before it utilized the benefit of ASC 606, and recognized over 50% of its revenues upfront in fiscal 2020 and fiscal 2021. As has already been pointed out PTC had a very poor performing year either missing earnings, cash flow or bookings estimates or lowering guidance in three of the four quarters during 2019. In fiscal 2020 and fiscal 2021 you can't judge accurately PTC's sales results because it was gaining the huge benefit of recognizing over 50% of subscription sales upfront compared to when it recognized revenue ratably.

My calls to PTC resellers in 2020 and 2021 showed about an average of about 14% sales declines based on two sets of calls in 2020 and about 10% sales increases in 2021. These calls indicate it is not a strong sales environment that PTC is operating in. Obviously the resellers sales results are very telling as they aren't public companies with pressure to somehow some way come up with strong sales growth for investors . One of PTC's resellers told me that PTC has been cutting back on the commissions it pays to resellers, so, this might explain some of the discrepancy between PTC's results and the resellers results.

A manager from PTC's largest reseller told me in the fall of 2018 that PTC's renewal rates for subscription customers was 65% when management had been expecting 90% renewal rates. The manager from the largest reseller's information proved to be very accurate as PTC had the aforementioned very poor financial performance in 2019. The fact that customers were renewing at such low rates kills the subscription model as the customers are paying less than what they did for a perpetual license the first few years. The software company selling via a subscription starts to make more money if the customers renews for more than 4 years. And customers are very aware they are paying more money for a subscription contract.

Here is an exact quote from a sales person at one of PTC's largest resellers, " I listen to some of the things they say (meaning PTC's management) and say to myself that is not true". This is what a sales person told me when I called him out of the blue to ask about PTC.

The employee of the largest reseller I referred to earlier in this section told me that many customers are furious at having to buy software via subscriptions because they know they are paying more money for the same thing. I also had other resellers tell me that customers feel they are being ripped off by PTC. The response will be they will buy less subscriptions. And this is exactly what the manager at the largest reseller told me they were doing three years ago.

Here is what PTC's CFO said at a conference hosted by investment banking company Stifel Nicolas on June 8th, 2021, " And I have mentioned three elements because it is all related to how customers, the value we bring to customers. And not only do they not want to buy things. They want to subscribe to them" That statement by PTC CFO is not true in my opinion. As I said, resellers told me that many customers know they are paying more money with subscriptions, and many are very mad about paying more money to PTC for the same thing that they use to own for less money.

The responses from resellers indicate that sales are not strong. Ten percent increases off of double digit decreases is weak sales growth. One sales person told me that he is getting one in person meeting with potential costumers per month this year. He said pre - COVID he got 3 to 4 in person appointments a week.

In general the resellers do not speak highly of PTC as you would expect of a sales organization that represents a product line would.

VI. PTC management pushes investors to judge PTC based on the metric that never goes down, Annualized Run Rate (ARR)

Exhibit 2

PTC financial growth data fiscal 2019

*** Quarterly bookings guidance data is the guidance established before the given quarter started**

Rev. - Revenues

*** In millions**

	Rev. growth	Annual bookings guidance	Quarterly booking guidance	ARR % growth	bookings
Q-1-2019	9.10%	500 - 520	100 -110	12.6%	101
Q-2-2019	2.50%	485-505	107-120	10.9%	112
Q-3-2019	2.40%	458 - 468	110-120	9.4%	109
Q-4 -2019	7.30%			10.3 %	150

In this section I will explain how PTC's management has pushed investors to judge PTC based on the non - GAAP metric ARR when it fact the ARR has proven to have no correlation to actual real financial results.

PTC's management changed the definition of Annualized Run Rate (ARR) on 9/4/2019 to be the annualized value of our portfolio of recurring customer arrangements as of the end of the reporting period including subscription software, cloud and support contracts.

ARR results have gone up 10% or more unabated for several years. Since fiscal 2018 ARR has gone up over 10% every quarter except one quarter, which was the third quarter fiscal 2019, in which ARR went up 9.4%. In several quarters during the above mentioned period the reported results of other metrics such as revenues, net income or bookings came in under expectations and were poor, but, this had no effect on ARR results. This is why PTC' management loves to talk about ARR results. They are always good no matter how well PTC actually does.

PTC's management has spent the last 2 years putting considerable effort to plead with investors and "Street" analysts to value and judge PTC on the metric it calls ARR, and for them to ignore the income statement. ARR is not a GAAP defined metric. PTC's management decides what it means and can change the definition of ARR at any time which they have as already pointed out.

The main purpose of the income statement for PTC's management is to say the artificially high YOY sales increases that are completely because of the change to ASC 606 are proof it is taking market share. Management's argument is that because using the new revenue recognition method ASC 606 makes results " lumpy " and sporadic the proper way to judge PTC is by using their metric ARR.

In the above exhibit, **See Exhibit 2**, shows YOY revenue growth per quarter, bookings results per quarter, annual bookings guidance, quarterly booking guidance and YOY ARR growth rate pr quarter. For the given quarter the guidance for annual bookings growth rate is the annual guidance given that actual quarter and the guidance for quarterly bookings is the guidance given the previous quarter before the given quarter started. So, it is the guidance coming into the quarter for PTC to hit.

In the first fiscal quarter of 2019 you can see that PTC hit the low end of its bookings guidance range at $101 million. In that particular quarter it gave guidance for EPS and revenues beneath "Street" analysts expectations for the following quarter and had subscription sales for the quarter beneath forecasts. PTC's stock fell 5.8% the day after earnings were announced. It was the warning shot quarter for up and coming problems all year long in fiscal 2019. But, ARR was up 12.6%, despite the fact bookings, which are signed sales contracts during a given period, were really weak, and despite the fact PTC was struggling to hit both earnings and revenue targets. Bookings were actually down YOY from $104 million to $101 million. In 5 of the 8 fiscal quarters in fiscal 2018 and fiscal 2019 PTC's YOY bookings rates were well under its ARR growth rates, **See Exhibit 3.** It is incredible that both "Street" analysts and investors would give any credibility to the metric ARR when it is proven that ARR in many circumstances has little correlation to actual real results.

Exhibit 3

Annual run rate (ARR) growth rates vs. booking growth rates

Fiscal 2018 & fiscal 2019

Quarter	ARR * billions	growth YOY	Bookings * millions	
Q-3-2021	$1.42			
Q-2-2021	1.39			
Q-1 -2021	1.34			
Q-4-2020	1.27			
Q-3-2020	1.21			
Q-2-2020	1.18			
Q-1-2020	1.16			
Q-4-2019	1.116	10.20%	$150	flat
Q-3-2019	1.088	9.40%	109	-3.50%
Q-2-2019	1.065	10.90%	112	13.10%
Q-1-2019	1.045	12.60%	101	-2.80%
Q-4-2018	1.012	11.80%	149	3.40%
Q-3-2018	0.994	14.90%	113	25.50%
Q-2-2018	0.961	15.20%	99	4.20%
Q-1-2018	0.928	13.30%	104	15.50%

Q-4-2017	0.905	144
Q-3-2017	0.865	90
Q-2-2017	0.834	95
Q-1-2017	0.819	90

Bookings are signed sales contracts that are actually transacted in a given quarter. If the number of signed sales contracts are in general weak during a 1 year period as they were in general in fiscal 2019 how can the results of ARR, which is supposed to be the value or all contracts annualized at end of a reporting period be always very strong ? Wouldn't you expect the trend of signed contracts to influence the results of ARR ? The booking results have not affected the results of ARR, and this fact makes no sense.

It is long been argued on Wall Street amongst investors, portfolio managers and analysts whether non - GAAP results should be considered legitimate. In the end the proponents of non - GAAP metrics have won out and non - GAAP results are for the most part widely accepted. But, non - GAAP results usually have to do with net income results and not sales, and there is a requirement to reconcile non - GAAP results to GAAP results. I don't agree with the legitimacy of non - GAAP results, but, to some degree the non - GAAP results are tied into the GAAP income statement or can be proven to be not valid by actual cash flow results. For example, the top of the cash flow statement starts with GAAP earnings, not non- GAAP earnings. So, if a company is always reversing non - cash reserves or booking not cash gains into non - GAAP earnings it won't help cash flow because the top line for operating cash flow is GAAP net income and not non - GAAP net income.

With ARR there is no tie in with either the GAAP income statement of the cash flow statement. The Financial Accounting Standards Board (FASB) has not set any guidelines on how ARR can be derived at. PTC can completely make up what ARR results are and there is nothing to hold them accountable. With non - GAAP net income results, in comparison, if over a number of years a company is constantly taking restructuring charge offs, and excluding them from non - GAAP net income results or is reversing reserve accounts into non - GAAP net income results or booking non - cash one - time gains into non GAAP net income results this will show up in the cash flow statement as cash flow growth will not correlate with net income growth. This is not the case with ARR, as I have said there is no tie in with ARR and any FASB defined GAAP financial statements.

To further prove my point on how ARR can have no correlation to actual real financial results in the second fiscal quarter of 2019 PTC again gave guidance beneath "Street" analysts expectations for both earnings and revenues and also lowered annual booking guidance beneath its previous guidance, yet, its ARR growth was 10.9%. PTC's sales growth was only 2.5%, yet, its ARR growth was 10.9%. It lowered guidance for both bookings and earnings and revenues, yet, its ARR growth was 10.9%. Its business was in the middle of a multi quarter free fall, yet the lowest ARR growth lowest growth was 9.4% during this period. In the third quarter of 2019 it again lowered guidance on almost every metric: earnings, bookings, cash flow and revenue, and still its ARR growth was 9.4%. In this quarter its ARR growth was 9.4%, and its sales growth was 2.4%. PTC's stock fell almost 20 % the day after earnings announced, and yet ARR growth was almost double digits.

PTC's results in fiscal 2019 prove that using ARR as a metric to judge the truth about a company's financial results is pointless, and actually quite corrupt. For 'Street" analysts to spend time making models to forecast ARR is the height of corruption. In my opinion it means they are complicit in the scheme with PTC's management to defraud investors by deceiving them into thinking ARR is actually some type of real, legitimate mathematical formula to use to assess PTC's financial results when it is not.

VII. Large one - time gains and very weak earnings quality mask a weak business proven by horrible retained earnings numbers and very weak cash flow growth

PTC over a number of years has used a vast assortment of aggressive accounting maneuvers to artificially increase net income. PTC's current retained earnings of only $121.7 million as of its third fiscal quarter after being a public company since 1989 are the dead giveaway that PTC has very weak earnings quality. In this section I will explain some of the aggressive maneuvers and one - time gains PTC has used over the years to cover up for a company that in reality is a slow growth company that has exhibited very low operating cash flow growth over a number of years.

PTC's sales and marketing expenses dwarf all of its other expense categories. Its sales and marketing expense for fiscal 2021 was $517.7 million. Its next highest expense category to sales and marketing was general and administrative expenses at $299.9 million in fiscal 2021. PTC had 1,866 out of 6,293 employees working in sales and marketing as of its most recent 10K, which came out in November of 2020.

One of the biggest boons for software companies from the adoption of the new revenue recognition policy ASC 606 was that it allowed PTC to amortize and spread sales commissions out over 5 years. Before the adoption of ASC 606 PTC expensed sales commissions immediately as the expenses were incurred. Software companies like PTC are now expensing only 20% in the first year the expense is incurred of what previously it expensed for sales commissions. In fiscal 2020 PTC amortized $36.2 million in sales commission expenses, and in fiscal 2019 it amortized $30.4 million in sales commissions. Given how big an expense sales commissions are for a software company like PTC in the first few years after switching to amortizing sales commissions expenses over 5 years companies like PTC experience sizable increases to net income. After 5 years of amortizing expenses the benefit will be gone, but, in the first three years, including this year, fiscal 2021, PTC will large net income benefits for paying less in sales expenses than the years before it adopted ASC 606. And this is just from a change in an accounting rule. The actual true costs and cash flow for expensing sales commissions hasn't changed. The sales people are getting paid the commissions just like before when PTC use to expense commissions right away. Partially as a result of the amortization of sales commissions PTC's other asset category grew from $ 140.1 in fiscal 2019 million to $212.5 million in fiscal 2020. Its other asset category has further grown to $ 276. 5 million so far in fiscal 2021 through 9 months. The increase in other assets of course decreases operating cash flow.

I have already pointed out the massive sales gains that companies like PTC benefitted from when it adopted ASC 606 and recognized over 50% of sales right away. One can only imagine the operating income leverage for PTC being able to spread much lower expenses because it is expensing much less in sales commissions over much higher revenues. Again, as mentioned now that we are past two years from when ASC 606 was adopted the sales benefit will mostly go away, and as each year that passes the expense benefit will be less.

Besides being the huge beneficiary of the huge short term one - time gains to be had from the switch to the new accounting rule ASC 606 PTC has utilized many short term one - time gains to boost earnings and cash flows over the years.

Exhibit 4

PTC acquisitions - Fiscal 2012 - fiscal 2021

*** in millions**

Acquisitions	Price * in millions	Year
Arena Solutions	$715	2021
Onshape	469	2019
Frustum	69.5	2018
Kepware	99.4	2016
Vuforia	64.8	2015
Coldlight	88.6	2015
Axeda & Atego	212	2014
Thingworx	111.5	2014
Netideas	25	2013
Servigistics	220.8	2012

As an example of the many one - time gains PTC has realized over the years, PTC acquired SAAS PLM vendor Arena for the astronomically high amount of $715 million in January of 2021. **See Exhibit 4.** According to PTC management in a SEC filing in January Arena had made $50 million in ARR in the year before PTC acquired it. PTC management also said in a filing that Arena would be neutral to operating cash flow in fiscal 2021. PTC's management also said that Arena would add 400 basis points to ARR growth in fiscal 2021. In its10Q filing for its third fiscal quarter PTC's management said it added $57 million in ARR from a contribution from Arena. Going by what management said Arena would contribute to ARR and operating cash flow in January it would be expected Arena would contribute about $17 million per quarter in ARR. For the third fiscal quarter according to PTC's management the acquired Arena business contributed $57 million. PTC's management also said that the new Arena acquired business would be cash flow neutral for PTC in fiscal 2021,but, later said in its third fiscal quarter 10Q that PTC's cash flow benefitted from a contribution from Arena. It is easy to infer from the above sequence of events that PTC's management low balled what the contribution from Arena would be so that it would beat expectations later in the year. PTC's management forecasted about a $17 million per quarter contribution from Arena in ARR and it ended up making $57 million in ARR in the third fiscal quarter. That's a big difference between the forecast and the actual result. PTC's management said Arena would be cash flow neutral for fiscal 2021 and the later in its third fiscal quarter 10Q said Arena was one of the contributing factors for cash flow growth.

PTC's management said that its contribution from its revenues from its Arena acquisition was $10 million for the third fiscal quarter and $18 million for the full fiscal year, of which Arena only was part of PTC for 2 quarters. Which indicates that Arena generates about $40 million per year in revenues, which means PTC paid about 18 times revenues for Arena. It is common practice for companies to acquire other companies partially because of the legal accounting maneuvers they can use to increase cash flow the first year of the transition. It is easy to see how PTC's management was thinking about how Arena could help cash flow when it was under enormous pressure to show an increase in cash flow because the income statement was deemed less important because of ASC 606.

Exhibit 5

PTC GAAP net income vs. non - GAAP net income

Fiscal 2014 - fiscal 2021

***In millions**

	GAAP Net income	Non- GAAP net income
2021	$470.1	476.9
2020	134.9	287.4
2019	-27.4	194.5
2018	51.9	171.2
2017	6.2	137.5
2016	-54.4	137.8
2015	47.5	259.1
2014	160.1	260.3

The difference between PTC's GAAP net income results and its non - GAAP net income results are amongst the highest I have ever observed for a non start up, **see Exhibit 5.** Except for fiscal 2021 in which it received $248 million in one - time gains in its fourth fiscal quarter added to GAAP income in almost every year going back to 2014 its GAAP net income is only half of its non - GAAP net income. In fiscal 2020, for example, its GAAP net income was about 50 % of its non- GAAP net income. In fiscal 2019 its GAAP net income was negative $27.4 million and its non - GAAP net income was $194.5 million. PTC has taken an enormous amount of charge offs every year over a number of years. **See Exhibit 6**, for a list of its restructuring charges over the years. And all during these years it was also taking " acquisition" charges and accelerated depreciation charges and excluding intangible amortization expenses from non - GAAP results. Despite the fact that PTC was according to its management a " growth" company it has constantly been doing massive lay - offs over a period of many years. The turnover is very high at PTC. I noticed on Linkedin that a very high amount of PTC's ex- employees listed in Linkedin worked in its IOT or Onshape or Augmented Reality division. When PTC was missing forecasts during fiscal 2019 management blamed the inability to hire the right sales people as part of the reason why it was coming up short of sales goals, which is interesting giving the fact PTC has been constantly firing people and making severance payments over a number of years.

Exhibit 6

PTC Restructuring charges

Fiscal 2014 - fiscal 2020

*** In millions**

	Restructuring charge * in millions
2020	$32.70
2019	51.1
2018	1
2017	7
2016	76.3
2015	43.4
2014	28.4

The very high amount of charge offs PTC has taken over a number of years is indicative of a company that can't grow its business by normal organic means. It must write off expenses to lower expenses to increase its net income. PTC can't go on forever taking write offs, and the constant charge offs are a major red flag that a company is using aggressive accounting maneuvers to hit earnings targets.

The massive difference between PTC's GAAP net income results and its non - GAAP net income results depicts a company with very weak earnings quality.

PTC has increased its debt from $ 669.1 million at the end of fiscal 2019 up to $1.439 as of its fourth fiscal quarter. It has a very high amount of debt for a technology company. Its interest payments increased from $43 million in fiscal 2019 up to $ 76.4 million in fiscal 2020. Its interest payments were only $37.6 million through 9 months of this fiscal year compared to paying $ 64.3 million in interest payments in the same three quarters a year ago because it changed the quarters it was making its interest payment to the second and fourth fiscal quarters from the first and third quarters, so, payments are less so far this year. It just borrowed over $1 billion for two companies, Onshape and Arena in which one company, Onshape is years away from being profitable, and the other one, Arena, is cash flow neutral according to PTC's management, or maybe a little bit cash flow positive, but, probably definitely not profitable. It is the height of fiscal irresponsibility for PTC to pay so much for these two companies. And if we were not in a massive bubble for all things technology PTC's poor decision to pay so much money for these two companies would stand out.

PTC's accumulated deficit in 2014 before it embarked on its change to selling its software via subscriptions was $650.1 million. I use 2014 as a point of reference because as mentioned it is to be expected for the first few years after selling via a subscription that your company will be much less profitable than in previous years, so the years after it switched to selling via a subscription it was expected PTC would have poor net income results. In October 2018 after 4 years of selling via a subscriptions PTC's accumulated deficit was negative $ 599.4 million. In fiscal 2019 PTC increased its equity by $ 363.2 million net of tax because of the change to adopt the new revenue recognition policy ASC 606. The concept apparently is that if PTC was recognizing 50% or more of its revenues upfront allowed under ASC 606 over whatever period it was looking at from a backward perspective its net income would have been $363.2 million higher. I am not going try to figure out how PTC's management came up with such a large increase to equity, but, what I do know is it is just an accounting change to when income is recognized and not a change in what PTC actually made in profits.

What is obvious, however, is if equity was increased with such a large lump sum increase it will be balanced by the recognition of less income moving forward or should be .

If PTC did not receive this large increase to equity its equity, which was $121.7 million as of its third fiscal quarter of fiscal 2021, it would have negative $241.5 million in equity. PTC went public in 1989. The fact that PTC's would have an accumulated deficit of $ 241.5 million if not for the lump sum increase to equity from the accounting change underscores the fact that PTC is not a well run, very profitable business. It is in two very slow growth industries, CAD and PLM, and has used a series of aggressive accounting maneuvers to mask what PTC's businesses are really all about, which is slow growth.

PTC operating cash flow is another data point that proves PTC is a slow growth business in two slow growth niches. Operating cash flow was $222.2 million in fiscal 2008 before the financial collapse in the worldwide economy. **See Exhibit 7.** Its operating cash flow made it back to 2008 levels in 2013 at $224.6 million. In 2014, its operating cash flow reached a high point of 304.5 million. Before 2021, its Operating cash flow never had another year above $300 million besides fiscal 2014. Its operating cash flow fell back beneath the $200 million levels in the few years after its transition to selling via subscription. In 2019 and 2020 its operating cash flow was $ 285 million and $233.8 million. The average of those two years is about $260 million. PTC's operating cash flow this year for fiscal 2021 was $368.8 million, which is an extreme outlier. As I pointed out in the earlier section on cash flow I believe PTC's 2021 operating cash flow exhibited some very unusual characteristics, such as a much higher than expected rise in deferred revenues when the fact it is recognizing a much percentage of revenues on each sale should make deferred revenues go down, not up, which would be a negative against operating cash flow, and not a positive. I consider 2021 cash flow an outlier, and that cash flow will fall back to the previous mid - $200 million levels or lower. So if I use the years 2019 and 2020 as the true example of what PTC's businesses are really generating in cash flow in 12 years PTC grew its operating cash flow from $222 million to $260 million. This would make the average annual increase of operating cash to be very low single digits. Very low growth indeed !

Exhibit 7

PTC Operating cash flow

Fiscal 2008 - fiscal 2021

Year	Operating cash flow *in millions
2021 -	$368.8
2020	233.8
2019	285
2018	247.8
2017	134.5
2016	183
2017	134.5
2016	183.1
2015	179.9
2014	304.5
2013	224.6
2012	217.9
2011	78.6
2010	156.6
2009	69.6
2008	222.2

VIII. Valuation and earnings forecast

PTC's stock is trading at about 30 times "'Street " its 2021 earnings, obviously at a very high multiple like most other stocks in the market today. I am forecasting that PTC's EPS falls to $2.89 for fiscal 2022 on 4% YOY lower revenues and lower margins, **See Exhibit 8 on page 28**. I am going to attach a 17 PE multiple to PTC's stock and value PTC's stock at $49.13. The model does not include updated input for the fourth fiscal quarter of 2021 as it was done before the results came out.

Exhibit 8

Earnings model forecast for PTC for fiscal 2022

See page 31 below

PTC, Inc.	Sep-18 2018	Sep-19 2019	Sep-20 2020	Sep-21 2021	Dec-21 Q1: 2022	Mar-22 Q2: 2021	Jun-22 Q3: 2022	Sep-22 Q4: 2022	Sep-22 2022
Revenue Growth YOY									
License and Subscriptions	44.0%	-44.7%	65.1%	35.0%	-5.0%	-6.0%	-8.0%	-11.0%	-7.5%
Support	-13.6%	54.1%	5.4%	14.0%	0.0%	0.0%	-3.0%	-5.0%	-2.0%
Porfessional Services	-13.7%	15.6%	-14.0%	8.8%	2.0%	0.0%	0.0%	0.0%	0.5%
Total Revenue	6.8%	1.1%	16.5%	20.2%	8.1%	8.1%	8.1%	8.1%	8.1%
Cost of Revnue/Revenue									
License and Subscriptions	16.1%	17.0%	10.5%	8.7%	11.0%	11.5%	11.5%	11.5%	11.4%
Support	17.8%	17.5%	18.1%	18.1%	18.3%	18.3%	18.3%	18.3%	18.3%
Porfessional Services	97.9%	83.5%	95.0%	91.8%	90.0%	92.0%	92.0%	92.0%	91.5%
Total Revenue	26.3%	26.0%	23.0%	20.4%	20.0%	25.9%	25.9%	25.9%	24.4%
Operating Expenses/Total Revenue									
Sales and Marketing	33.4%	33.4%	29.9%	29.7%	31.0%	31.0%	31.0%	32.5%	31.4%
Research and Development	20.1%	19.7%	17.6%	17.3%	19.0%	19.0%	19.0%	20.3%	19.3%
General and Administrative	11.5%	10.2%	10.9%	11.6%	11.0%	11.0%	11.0%	11.0%	11.0%
US Pension Settlement Loss	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Amortization of Acquired Intangible Assets	2.5%	1.9%	2.0%	1.6%	1.5%	2.5%	2.5%	2.5%	2.2%
Restructuring Charges	0.3%	4.1%	2.1%	0.2%	0.5%	0.5%	0.5%	0.5%	0.5%
Income Statement									
Revenue:									
License and Subscription	591,661	324,399	509,791	688,290	168,316	186,130	150,496	128,804	636,668
Support	496,817	763,501	804,925	917,622	216,245	223,756	223,925	234,313	899,270
Professional Services	153,338	167,530	143,798	156,427	36,343	40,018	41,234	37,679	157,209
Total Revenue	1,241,816	1,255,630	1,458,415	1,755,550	420,904	449,904	415,656	400,795	1,687,259
Settlement Adjustment -Subscription Rev.									
Settlement Adjustment - Servicee Revenue									
Fair Value of Acquired Service Revenue									
Fair Value of Acquired Deferred Revenue	1,075	721	-	-					-
Total Non-GAAP Revenue	1,252,419	1,256,174	1,457,815	1,755,850	420,904	449,904	415,656	400,795	1,687,259
Cost of Revenue:									
Cost of Licence and Subscription Revenue	94,108	51,936	53,169	59,553	18,515	21,405	17,307	14,812	72,421
Cost of Support Revenue	88,575	133,508	145,386	165,888	39,674	41,052	41,083	42,989	164,988
Cost of Professional Services Revenue	143,511	139,964	135,710	143,642	32,708	36,817	37,935	34,664	143,846
Total Cost of Revenue	326,194	325,358	334,284	365,844	90,897	99,274	96,326	92,466	378,963
Gross Margin	915,631	930,252	1,124,124	1,389,706	330,007	350,631	319,330	308,329	1,308,297
Fair Value of Acquired Deferred Revenue	702	787	-	-					-
Settement Adjustment Revenue									
Fair Value Adj. to Acquired Deferred Costs	(391)	(308)	-	-					-
Stock Based Compensation	11,513	11,939	13,969	18,034	4,000	3,000	3,000	3,000	13,000
Amort. Of Intangible Assets in Costs of Reven	26,777	27,306	27,301	29,804	7,200	6,800	6,800	6,800	27,600
Non-GAAP Gross Margin	964,124	969,960	1,165,498	1,437,254	341,207	360,431	329,130	318,129	1,348,897
Operating Expenses:									
Sales and Marketing	414,524	416,944	435,491	521,818	130,480	139,470	128,853	130,258	529,378
Research and Development	249,774	246,887	256,565	303,507	79,972	85,482	78,975	81,361	326,063
General and Administrative	142,981	127,919	159,826	203,203	46,299	49,489	45,722	44,087	185,599
US Pension Settlement Loss	-	-	-	-	-	-	-	-	-
Amortization of Acquired Intangible Assets	31,330	23,769	28,713	28,118	6,314	11,220	10,366	9,995	37,885
Restructuring Charges	3,764	51,114	30,716	2,834	2,176	2,325	2,148	2,072	8,721
Total Operating Expense	845,393	866,705	913,291	1,059,910	265,240	287,987	266,064	267,774	1,087,066
Operating Income	73,238	63,002	210,863	329,796	64,766	62,644	53,266	40,555	221,231
Fair Value of Acquired Deferred Revenue	1,298	787	-	-					-
Sttlement Adjustment Revenue	9,296	-	-						
Fair Value Adj. to Acquired Deferred Costs	(391)	(308)	-	-					-
Stock Based Compensation	82,924	86,400	115,159	163,896	37,000	32,000	32,000	30,000	131,000
Amort. Of Intangible Assets in Costs of Reven	26,777	27,306	27,391	-					-
Amort, of Acquired Intangible Assets	31,384	24,741	28,613	58,352	14,500	13,500	13,500	13,000	54,500
Acquisition Related Charges in G&A Expense	1,835	1,568	8,296	15,844	500	500	500	500	2,000
US Pension Plan Terminated Related Costs	-	-	-	-	-	-	-	-	-
Pending Legal Settlement Accrual	-	-	-	-	-	-	-	-	-
Headquarters Relocation	2,911	1,907	-	-					-
Restructuring Charges	907	49,207	32,616	613					-
Non-GAAP Operting Income	230,179	255,292	419,448	568,472	116,766	108,644	99,266	84,055	408,731
Foreign Currency Losses	(6,856)	-	-	-	-	-	-	-	-
Interest Income	3,819	-	-	-	-	-	-	-	-
Interest Expense	(41,673)	(43,077)	(76,896)	(50,621)	(11,500)	(13,000)	(12,000)	(13,000)	(49,500)
Other Expense	255	306	272	(6,556)	(800)	(800)	(800)	(800)	(3,200)
Income Before Taxes	28,657	20,301	134,706	272,619	52,466	48,844	40,466	26,755	168,531
Provision for Income Tax	(23,330)	47,761	4,004	37,053	2,000	2,000	2,000	2,000	8,000
Net Income	51,987	(27,460)	130,702	235,566	50,466	46,844	38,466	24,755	160,531
Fair Value of Acquired Deferred Revenue	1,298	787	-	-	-	-	-	-	-
Settlement Adjustment Revenue	9,296	-	-						
Fair Value Adj. to Acquired Deferred Costs	(391)	(308)	-	-	-	-	-	-	-
Stock Based Compensation	82,924	86,400	115,149	163,896	37,000	32,000	32,000	30,000	131,000
Amort. Of Intangible Assets in Costs of Reven	26,777	27,306	27,391	-	-	-	-	-	-
Amort, of Acquired Intangible Assets	31,384	23,891	28,613	58,354	14,500	13,500	13,500	13,000	54,500
Acquisition Related Charges in G&A Expense	1,835	3,110	8,596	15,844	500	500	500	500	2,000
US Pension Plan Terminated Related Costs	-	-	-	-	-	-	-	-	-
Pending Legal Settlement Accrual	-	-	-	-	-	-	-	-	-
Headquarters Relocation	4,807	1,907	-	-	-	-	-	-	-
Restructuring Charges	(1,300)	49,207	32,616	584	-	-	-	-	-
Debt early redemption									
Non Operating Loss	11	-	3,451	-	-	-	-	-	-
Income Tax Adjustments	(37,443)	29,781	(63,279)	(43,065)	6,000		(10,000)	(6,000)	(10,000)
Non GAAP Net Income	171,485	194,511	298,448	431,179	108,466	92,844	74,466	62,255	338,031
Diluted EPS	$ 0.44	-$ 0.23	$ 1.12	$ 2.01	$ 0.43	$ 0.40	$ 0.33	$ 0.21	$ 1.37
Adjusted Diluted EPS	$ 1.45	$ 1.64	$ 2.57	$ 3.66	$ 0.93	$ 0.79	$ 0.64	$ 0.53	$ 2.89
Outstanding Diluted Shares	117,000	117,000	117,000	117,000	117,000	117,000	117,000	117,000	117,000