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Wrist Wars: Smart Watches vs Traditional Watches

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Abstract

Wearable technology is the latest buzzword doing rounds in Technology forums with humongous growth expected in next few years. Of various devices, "Smart Watches" have shown most promise. A lot of companies have already launched Smart Watches or have indicated an interest to explore this area.

In this paper, we try to understand the following: Definition of Watch and how a "Watch" has changed over years, What are the Mechanism to keep time. How does a watch function. What is a Smart Watch? Its Past and Present, What are features that Smart Watch provides. How useful are these features?, Target Segment for Smart Watch. What factors could dictate decision of consumer to buy Smart Watch?, What is the outlook for Smart watch Market? How would Traditional watches fare once Smart watches become mainstream, Authors Conclusion around Smart Watches ability to disrupt the Traditional Watch market.

Keywords: Mechanical Movement, Quartz Movement, Smart Watches, Traditional Watches, Market Analysis

Introduction

Everyone knows what time it is. Thanks to tiny and hardly noticeable Wrist Watch. The concept of Watch dates back many centuries, however, Wrist Watches are relatively new concept. Since 1868, when first wrist watch was produced by Patek Philippe (for women), there has been a steady growth in acceptance of Wrist Watches. The first mass produced Wrist Watches for men were ordered by German Army and made by Girard-Perregaux and today, a Wrist Watch has become a common phenomenon.

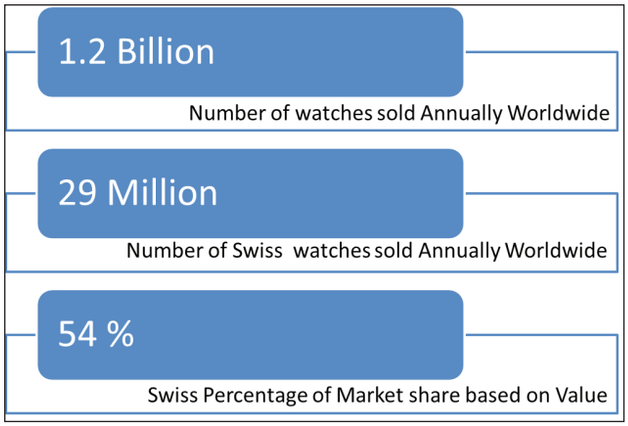
The latest to stake claim on wrist are Smart Watches. These are Wearable Devices that do much more than just tell time. Typically, they integrate with your Smart Phone and help users by logging lifestyle information, show alerts and interact with Smartphones. In this paper, we try to explore the World of Traditional and Smart Watches. Analyse the main features of these watches, understand market dynamics and challenges that both these types of Watches face. We also try to investigate how overall Watch Industry may behave after Smart Watches become main-stream.

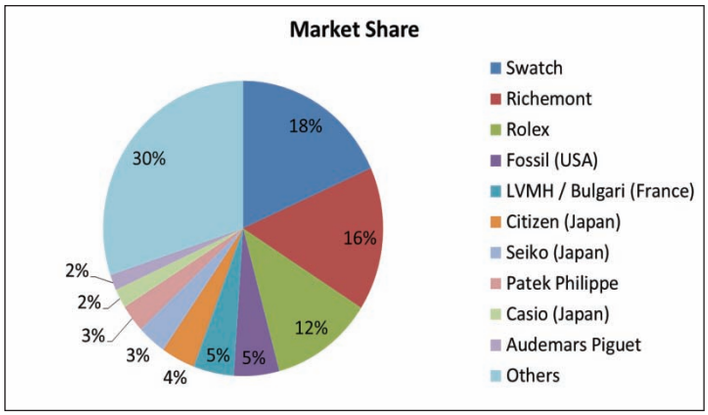
What is a Watch

Watch is a device used to measure the passage of time. Over years, there have been many different ways in which time was measured. Time measurement initially started out by looking at shadows determining time. These devices were called Sundials. The oldest record that is available shows sundials in use in ancient Egypt in 1500BC. The positions of shadows are used to determine approximate time of day. Over years, a lot of improvements were done on Sundial and many were installed. One of the famous Sun-dials in India is Jantar Mantar which was built in 1724.

Another interesting way of measuring time was using an hour glass. They was quite popular in Europe and there are documented references dating back to 13th century. Hour glasses are still used for ornamentation or in children's games where accurate time measurements are not required.

In recent centuries, mechanical clocks were built to tell time. These were huge in size and expensive to own. They were deployed in clock towers, churches and other public buildings. Then, came the watches that we are familiar with today. Small Pocket Watches dominated the 17th-18th century. These were small watches that were typically carried in ones pockets. In early 19th Century, the wrist watches were mass manufactured and are now a globally accepted. Today, Wrist Watch industry is a Multi-Billion Dollar industry churning out hundreds of Millions of Watches each year.





Wrist Watches today, are primarily of two types: Quartz watches and Mechanical watches. From 19th Century, Watch industry has been dominated by mechanical watches. A major disruption was brought about when Quartz was used to make Watches. Being extremely simple to build and having great accuracy, Quartz watches eroded the Mechanical Watch market for about 30 years. The Mechanical Watch market reviewed in 1990 when the demand for high end Mechanical Watches increased globally. Mechanical watches have now become a Luxury collectables items. The Mechanical and Quartz Watches have both made a place for themselves and Market for both type of watches is on upside.

Traditional Watch Statistics

Given below are some of interesting statistics for Traditional watches. These have been collated from Internet resources

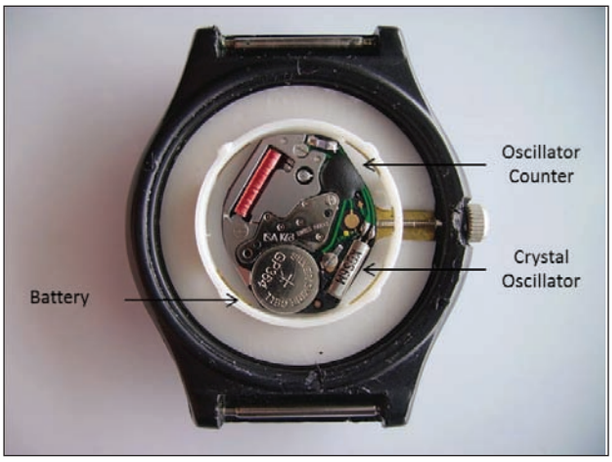
Some Facts

1. Swiss Watch Industry is the leader in watch Making with 54% Market Share
2. Chinese watch industry produces more number of watches than Swiss but creates watches of cheaper variant
3. Swatch and Richemont are prominent holding companies controlling most of the important Brands.
4. Independent Watch companies like Audemars Piguet & Patek Philippe (which make luxury time pieces) are able to hold on their own in spite of market consolidation. This is due to high quality time pieces and Brand Value that they have built over centuries.
5. The most recognizable brand in Wrist Watches is ROLEX. It has highest Market share for Luxury Watches.

What Drives A Traditional Wrist Watch

A Wrist Watch can be powered by Quartz movement or by a Mechanical Movement. Both these movements achieve the same purpose of measuring time accurately. However, they differ completely in the way how they do this. Lets try and understand both these.

Quartz:



Majority of clocks today use Quartz as their main component. Quartz is a crystal that vibrates when electricity is applied to it. In watch, a Quartz crystal is made to vibrate at a specific frequency which is counted by electronic circuit and converted to time as we know (seconds, minutes, hours). Most of the quartz crystals

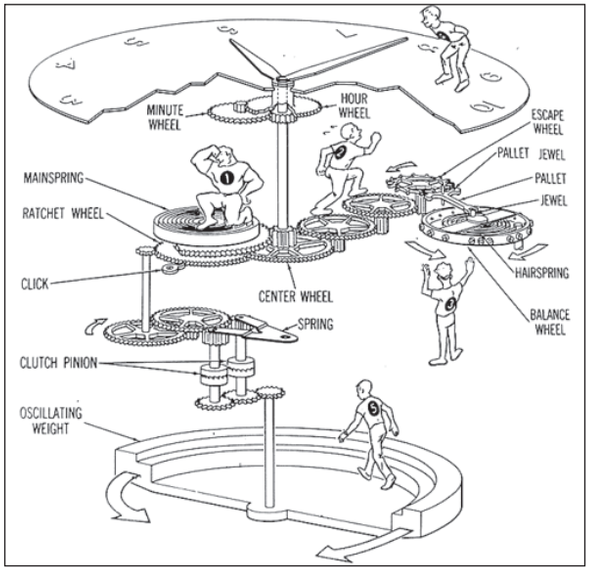
are made to vibrate at 32,768Hz which is 2^{15} and can be counted easily by logic circuit. The first Quartz watch was created in 1927 at Bell Telephone labs and have been mass produced since 1980 after they became inexpensive to create due to advancements in Solid state electronics.

Quartz have a high degree of accuracy and have revolutionized the watch industry by making high quality time pieces available at affordable rates. In fact, during the Quartz revolution, the Mechanical watch industry was at its worst phase and suffered terribly for few decades.

Mechanical

The basic elements of a Mechanical watch are springs and gear wheels. Using these elements, energy is saved on spring and then released in a controlled way to help the watch display time accurately. The accuracy of a Mechanical watch depends on how accurately the energy stored in springs is released and a lot of innovations has happened around this area. Shown below is a simplified explanation of how a Mechanical Wrist watch works.

1. Power is provided by mainspring.
2. Mainspring power is transmitted by wheel train through escape wheel and pallet to balance wheel
3. Accuracy is controlled by oscillating rate of balance wheel
4. The time indicating hands are turned by wheel train
5. The mainspring is wound by an oscillating weight which swings with the motions of the wearer



To improve accuracy and add complications(eg day, date display), the mechanical movements complexity increases. One direct result is increase in number of mechanical elements that make up the Watch. A simple Mechanical watch may have 100 elements (Swatch has last year released a ground breaking watch with only 51 components) and most complicated watch has 1,728 components. As these components are so small, designing and assembling them is in itself an art form. Infact, a lot of precious metal is also used to make components to enhance their life. High end Mechanical watches are still assembled and polished by hand and are expected to last Centuries.

Smart Watch

So, now that we have looked at existing watches, lets look at the latest disruptor in Watch Industry, a Smart Watches. Wikipedia defines it as follows

"A Smartwatch (or smart watch) is a computerized wristwatch with functionality that is enhanced beyond timekeeping, and is often comparable to a personal digital assistant (PDA) device. While early models can perform basic tasks, such as calculations, translations, and game-playing, modern smartwatches are effectively wearable computers. Many smartwatches run mobile apps, while a smaller number of models run a mobile operating system and function as portable media players, offering playback of FM radio, audio, and video files to the user via a Bluetooth headset. Some smartphone models, (also called watch phones) feature full mobile phone capability, and can make or answer phone calls."

Smart watches were one of the first Consumer goods to embrace wearable computing concept. That said, it was also the most logical device to move into the Smart Domain because of number of factors: Worn by almost everyone, socially accepted since decades, an extension of existing device, built to be on user for majority part of day, available power source which can be used for additional functionalities, etc. All these helped Smart Watches to be where they are presently.

The journey of Smart Watch started a long time back. People realized that they could try to get a lot more functionality on Wrist Watch. This was especially helped by the digitization of time keeping mechanism and better battery life. Seiko launched one of the first smart watches in 1980 called Data 2000. It had capability to store 2000

characters and display them on its screen. The data is input via large keyboard which communicated with the watch using electromagnetic pulses.

Some recent smart watches were made by:

- IBM in year 2000(WatchPad – Ran Linux)
- Palm in 2003(Palm Fossil Wrist PDA – which ran Palm OS)
- Microsoft in 2004(SPOT – used FM signals to receiveinformation)

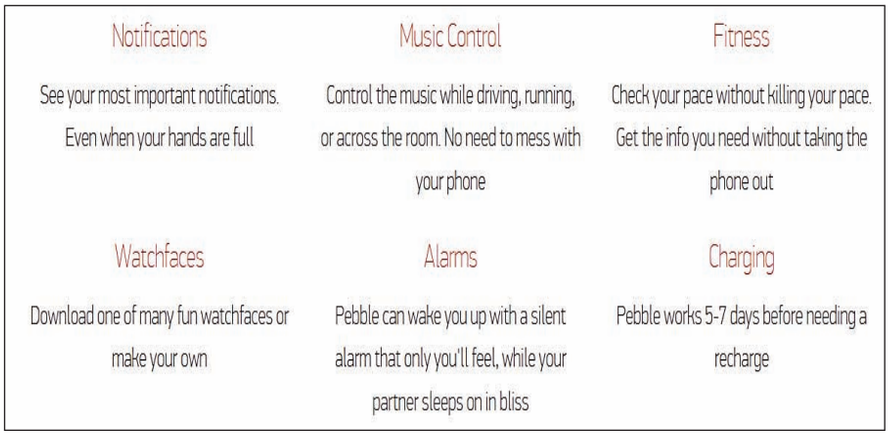
We may have not heard a lot of these watches due to various factors. Eg size, visibility, functionality etc. There was nothing really captivating with these devices and hence over a period of few years, these devices were no-where to be seen. But, that was not the end of Smart Watches as we see now. Companies have reinvented the Smart Watches to be more powerful, be able to do a lot more things and eco-systems are being developed for these devices.

So, what functions do new Smart watches perform. Smart Watches today are being seen as natural extension of Smart Phone and beyond. They interface with the Smart Phone and display alerts, setup reminders etc. The interfaces can also be used to share information from Smart Watches to Smart phone so that Applications on Smart Phone can use this data(eg ability of Smart Watch to detect wearers physical activity like walking) and feeding this information to App which processes this information and graphically display this as trend.

Smart Watches also have other capabilities like GPS which can be used for tracking applications. One use include tracking children and setting up perimeters for them. One of the older smart watches still being used are Timex Datalink. These watches have the ability to connect to Computer and download information like phone numbers, alarms, etc. These were supposed to replace PDA's with added benefit of being small and comfortable to carry. However, they were not as successful as expected and infact PDA's are also not seen today.

Lets look at current smart watches, understand how they are built and functionalities that they provide

The top selling smart watch today is Pebbles Smart Watch. This started off as a Crowd sourcing project(this is where funding for project is provided by ordinary people who pledge to support the project by contributing small amounts and are entitled certain benefits) in 2012. The project met its initial goal on $100,000 in first two hours, it had collected $10 Mil by the time it closed funding. At present, Pebble is the best Smart Watch available and they have sold about 400k pieces. Let us see what Pebble has to offer:



Other Major USP are its ability to work seamlessly with Android and iOS, specially built Apps that add more features and functionalities to Watch and Battery that lasts for 5-7 days. The Pebble App store has about 1000 apps which include different Watch Face, Apps for Cycling, Running etc.

Features of Smart Watch

So, practically, what does a Smart Watch do? Let's look in detail the features that are supported by Smart Watches today and their usefulnes:

1. Call Notification: Smart watches are capable of displaying Call Notifications. The Watch can display who is calling and also give you options to Accept or Reject Call. However, to speak to caller, one would need the Smart Phone or Blue Tooth headset connected with the Smart Phone. Some Smart Watches also allow access to Call Logs & Phone Menus.

   Pros: Useful feature when Smart Phone is not easily accessible eg when Driving, walking, etc. A flick of wrist and you know who is calling. Further action like Rejecting call or Pulling over to speak to person can be decided.

   Cons: Most Smart watches donot have ability to speak and hear via Watch (even those who have, it is very cumbersome to talk to a watch). This means Smart Watch only acts as an additional Notification device. This makes Smart Watch more of an Accessory to Smart Phone rather than a standalone communication device. Samsung Gear S which will be released this yearend will have be able to interact with Mobile networks without connecting to Smart Phone.

2. Display Text Messages and Emails: Smart Watches have ability to display incoming Text Messages and Emails. One does not need to remove Mobile Phone from pocket to view these

Pros: Fast access to incoming messages. Especially useful if one receives a lot of Messages and need to respond to few.

Cons: Can only display messages. To respond, one still needs to use the Smart Phone (Exception – Some Smart Watches have ability to reply with pre-configured replies or use speack recognition). There are also problem of Small font & basic display of messages that make experience seem like reading messages on feature phone.

3. Collect data via by sensors: Smart Watches also incorporate a number of sensors which measure and store data in Watch or pass it on to Smart Phone. Some examples are Bio-Metric sensors like Pulse measurement, Pedeometer, GPS for location tracking, gyroscope for identifying orientation, Magnetomer for Compass like applications and Accelerometer for measuring acceleration. These sensors collect data and can be converted into Intelligence by either the Smart Phone or Smart Watch.

   Pros: The availability of sensors enables specific use cases like health monitoring. Though, such sensors may already be available on Smart Phone, the ability to use these without the hassle of handling a phone, and being continuously connected to body has its own advantages.

   Cons: Limited by available hardware, there is a constraint on amount of data a Smart Watch can process and display. For complex calculations and display, there will be dependency on Smart Phone.

4. Integration with Smart Phone Apps: Smart Watches also integrate with a number of Apps on Smart Phone. Types of Apps also depend on the ability of Smart Phones. Generally Smart Phones are able to access some Native applications like Music Control, whereas others may integrate with GPS on Smart Watch and use location information intelligently. Other examples can be Apps that track distance walked, speed etc. Others include integration to Twitter notifications, Translator Apps, Baby Sitting apps, display Stock notifications, etc.

   Pros: Though, all what is being said above can be done by a Smart phone, the advantage that Smart watch provides is the ability to do/use all these apps without having cumbersome phone in your hands. It also becomes an additional sensor device for these applications.

   Cons: No new feature that makes Smart Watch a must have accessory.

Target Segment for Smart Watch:

Before looking at target segment, lets analyse the various factors that influence a buyers decision

Let's try and analyse how these factors play out for someone buying a Smart Watch:

1. Cultural: A Watch is worn on a wrist in all parts of globe. It is one of the few ornate devices that are worn by almost all men and women. However, depending on social class, the watch may be a simple time keeping device or a device used to show unique style, stature & wealth of individual.

   For Smart Watch, there aren't any Cultural barriers that need to be overcome. It is just a watch with added functionalities. What would be important are the use cases that Smart Watch support and Price Point for such devices. One point is sure, Smart Watches would only appeal to people who have used a Smart Phone. As they would understand the additional benefit that Smart Watches have. There are possibilities that people who do-not have smart phones, may buy Smart Watches, but given the capabilities of Smart Watches and their dependency on Smart phones, this seems unlikely. Smart Watches are available in Low to Medium Price range. So, this should make Smart Watch accessible to broad range of consumers.

2. Social Factors: Buying decisions also depend on Social life & social circle. Some factors that impact buying are the kind of people/groups we interact with, our family and social status. If the group that we hang out with are early adopters of Technology, then, one would automatically be influenced to keep himself updated with latest technology and gadgets.

   Smart Watch will be an innovative device trying to build a different segment for itself. The initial devices are also not up to the mark.So, there may not be a lot of social influence on buyers mind. However, as this is a new device, there could be the influence of owning the latest device in Social circle that will influence the buyer to buy a Smart

Watch. Or, if one has conservative circle, then he would be influenced to wait till these devices become mainstream and then think of buying them.

3. Personal Factors: Some of the Personal Factors that influence buying decisions are Age, Occupation, Economic situation, Lifestyle and Personality. What does one think of the product, the usefulness, the benefit it will have, all these will affect buying decisions.

   Personal Factors will be hard to understand as these would depend person to person. Some possible external factors that will help us understand behaviour patterns will be the type of functionalities available on Watch, the price points and the Buzz the devices can generate. If rumours are to be believed, Apples Smart Watch will have health monitoring system. This could be something which fitness junkies or people who need continuous monitoring will be really interested in. That said, someone who has resources and is interesting in evaluating new technology will surely be interested in investing in a Smart Watch.

4. Physiological factors: From Physiological perspective, factors like Motivation, Perception and Beliefs come into play. These may be different for different people. How does one perceive a new product completely depends on person's independent thoughts and belief system.

   Let us try and analyse this a little further. Motivation to buy a smart watch may be two fold, a. To buy a new gadget that has certain additional capabilities than a Watch(is safe to assume that almost all who would want a watch will have a watch),

   b. One would like to buy smart watch as additional watch to add variety to existing watches that one has. Perception may be different for different people. Some will perceive Smart Watch as a forceful iteration of a classic gadget and may be completely turned- off. This behaviour will also be compounded by fact that almost all functionalities of Smart Watch will be available in Smart Phone. Other perspective will be where users will identify with the additional benefits that smart watches provide over other devices and see value.

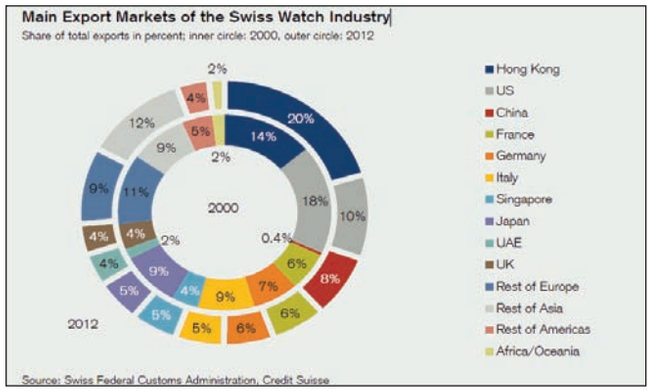
   Given this understanding, it would be safe to assume following for Target Segment:

   - Initial uptake will be done by early adopters of Technology till Smart Watches are widely available and accepted
   - Users will be directly proportional to the number and type of use cases that Smart watch supports
   - Smart watches will try to target existing Lower to Middle Segment of existing Watch market
   - Consumers who use Smart Phone/Smart Devices would be the main users of Smart Watch

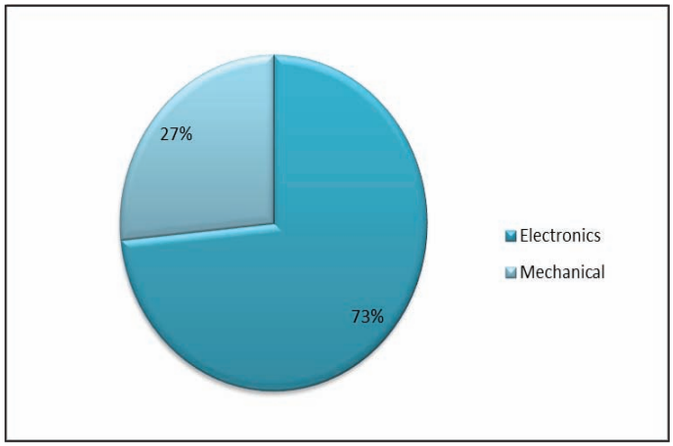
Market Analysis:

Let's now try an look at some market figures and try to understand what could be the impact of Smart Watches on Watch Industry. We will take reference of Swiss Watch industry due to readily available data points.

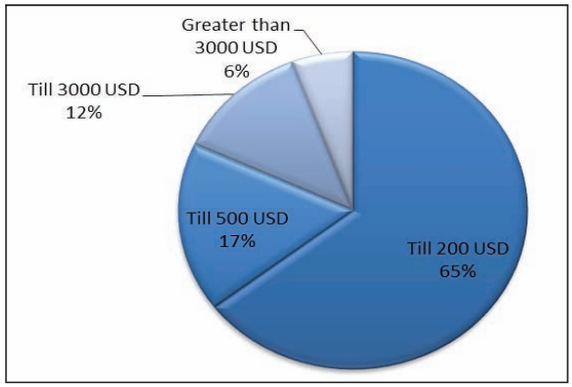
Main Export Markets for Swiss Watch Industry



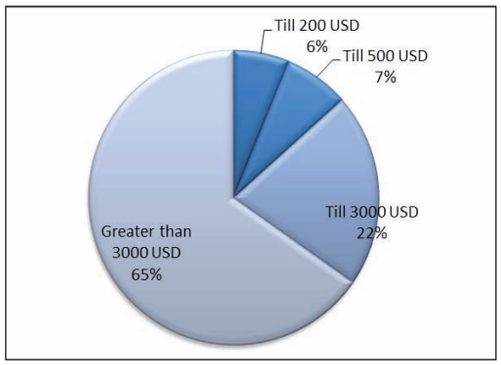
Split of Electric and Mechanical Movements for Swiss industry for 2013



Distribution of Revenues for Swiss Watches based on Selling Price(for 2013)



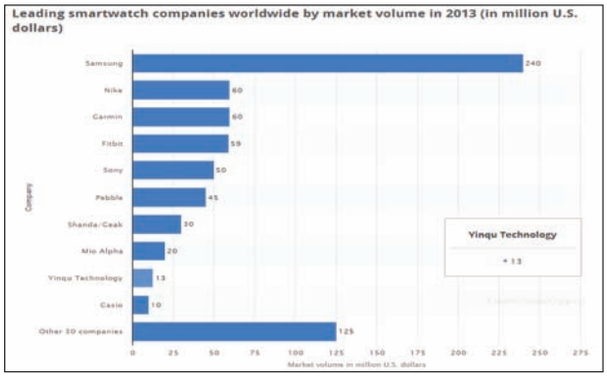
Distribution of Swiss watches based on Selling Price(for 2013)

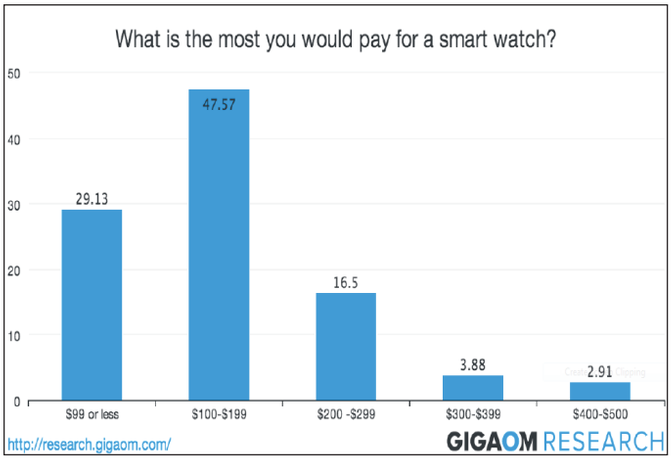


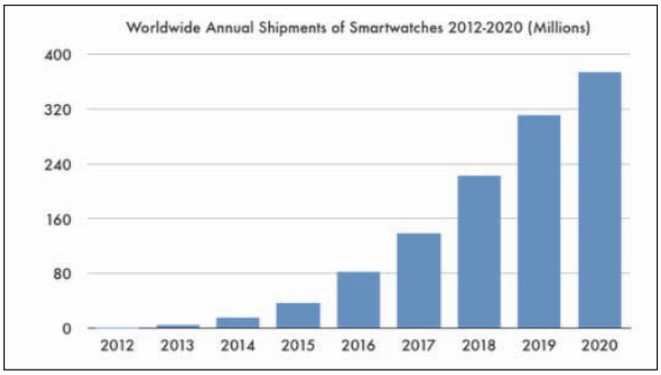
Some Observations:

1. Swiss Watch go to every corner of the world. Growth in some markets in positive while negative in some markets.
2. The percentage of Electric watches is almost 3 times higher than mechanical watches
3. Majority(65%) of the watches produced by Swiss industry are sold at around USD 200
4. However, 65% of Revenue for Swiss Watch industry comes from expensive luxury pieces costing USD 3000+

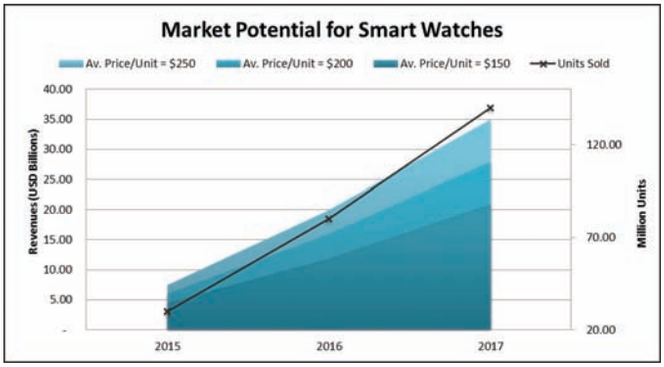
Some Facts about Smart Watch industry







Some Interpretations:



- The Smart Watch industry is expected to grow ten's of times each year for next few years
- With an assumption of $200 as average price of Smart Watch, for year 2016, it is expected that 70 Mil units will be sold and Industry will be worth USD 15 Billion
- Comparing with Traditional Watch Industry, which is worth USD 60 Bil, Smart Watch industry does pose a threat at $200 level market.
- Above said, how much will Smart Watch industry cannibalize existing Traditional Watch market is

not clear. It is also possible that it may add to Total Revenues by adding on top of Watch Industry Revenues. This is possible if one believes in having multiple watches for different activities and use.

- Expensive Mechanical watches should not face threat as they have established their niche as Luxury Product line in market. They serve different customer base and that may not deviate towards smart watch. Even if, someone in this customer segment buys a buy Smart Watch, it would not be either/or decision.
- However, with even traditional Watch Making companies planning to release Smart watches, the exact impact on topline-bottom line of Watch Companies will be clearer only in next few years (eg Intel has tied-up with Fossil to create Smart Watch)
- With currently about 40 companies developing Smart Watches (this number is expected to go till 200), there will be various use cases which will be targeted by these companies. In this chaos, there will be a few handful of use cases and companies that will finally make the cut. A lot also depends on scalability of production lines for these devices. Smaller companies may have interesting use cases but may not be able to scale up production/ Marketing/Selling activities to capture major share
- Given the limitations of Smart Watch (low battery life, water protection, etc), there will always be use cases which require Traditional Watches. So, consumers may have (quite a few even today have) multiple watches for multiple purposes

Pic	Application	Key benefits	Example	Ranking 2020
	Personal assistance	Highly efficient, context-aware management of your calendar, tasks, and information needs	Your watch tells you when to leave for your next meeting, based on real-time traffic information	1
	Medical/health	Basis for huge improvements in therapy for various patient groups; tool to manage medical records	Your watch will prevent heart attacks, as it recognizes irregularities much earlier	2
	Wellness	Higher body awareness, more movement, better nutrition, less stress, improved sleep	Your watch will sustainably make you move more and eat healthier food	3
	Personal Safety	Prevention of emergencies; auto-detection and fast support in case it happens	Your watch will automatically detect if you are mugged, and trigger the needed actions	4
	Corporate Solutions	Simpler, more efficient, safer and cheaper business processes	Factories will optimize the workload and safety of their workers with smartwatches	5

Where would we see impact of smart watches the most. The easiest guess is in Healthcare industry where demand of continuous monitoring will be drivers. Some other areas that have been identified are shown above. This has been compiled by www.smartwatchgroup.com:

So, given the simple task of telling time becomes secondary and additional functionalities take prime estate on hand, the success of Smart Watch will depend completely on the Use Cases that it is built for and that will drive primary sales.

One of the latest announcements is of Smart Watch from Apple. Termed as “Apple Watch”, it has major focus towards Healthcare and Wellness Applications. Supporting software has also been created for iPhone so that both these work seamlessly. The initial videos do paint an extremely appealing picture with lots of functionalities. Their focus of pitching this as independent device and

not as a perifery to existing Smart Phone should help its cause. It would be really interesting to see if this watch is the breakthorough that revolutionies and pushes Smart Watch industry towards its predicted growth.

Conclusion

Smart watches signify next evolutionary leap in Smart Devices. Smart Wearable devices which remain on person for major part of day and help interacting with Physical and Digital world should turn a lot of heads. As this is a new market, there is no tried and tested winning formula. However, one thing is sure that this is an extremly interesting device that would be explored by lots of people. The availability of various and distinct use cases that device can do will directly impact Sales. Till the time a leader is clearly identified with mass market proposition, the industry will be fragemented and we should see plathora of devices satisfying diverse use cases.

For Traditional Watch industry, Smart Watches should come as a Wake up call. At present, it doesnot seem as a major disruptor due to lack of acceptability, high entry barriers (Watch + Mobile combination), low battery life(as compared to currnet watches), etc to overall industry. We are also seeing interest of major Tech Companies in development of Smart watches. This should surely throw a lot of interesting propositions to consumers. The High End Traditional Watch Market dominated by Mechanical Watches may not be inpacted by Smart Watch growth, but the mid segment watch makers should keep a very close tab on this as this is the market that will heat up.

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