

Designing the Intersection of Technology and Timepieces

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ABSTRACT

The smartwatch space has exploded in the last year or two. Companies are scrambling to create desirable products to occupy people's wrists. While timepieces have been around for centuries, smartwatches are just beginning. How do we leverage design to create a high end watch experience? What form, features, materials, aesthetics and user interface are appropriate?

Smartwatches are trying to appeal to users by taking design cues from the wristwatch. Despite this, they lack the critical functions to be considered a true necessity. Garmin is in a unique position to create authentic smart instruments or tool watches that are relied on in the most extreme conditions. Current Garmin watches have complicated UI's and aesthetics that do not appeal to watch enthusiasts.

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INTRODUCTION

1.1 Standing at the Crossroads

We stand at the crossroads of a major shift in the watch industry. Half a century ago the Swiss watch industry almost imploded. The quartz crisis of the 1970's almost drove the swiss watchmaking industry into extinction. The precision that had defined extremely expensive Swiss watches was surpassed by a very cheap alternative in the quartz crystal. The industry had to rebrand themselves and appeal to buyers on emotion vs selling on superior performance. In 2015 the industry faces another major threat from technology: smartwatches.

Of course there will always be a market for fine handmade watches but the question becomes, how can technology blend with this market? There are two main strategies being taken by technology companies. One is to make the smartwatch look as high tech as possible and sell it based on it's features and hi tech appearance. Another is to blend technology into traditional watch aesthetics.

Garmin is uniquely positioned to blend it's technology into the traditional watch aesthetic. Today's smartwatch offerings are mostly made for use indoors. Garmin's watches are purchased for their ability to survive outdoor activities. Our differentiation from mainstream smartwatches comes from the

demanding needs of our users. Some of the users we support include alpinists, runners, endurance athletes, hikers, xc skiers and swimmers. These people find themselves in extreme environments requiring waterproofing, sunlight readability, long battery life, and durable construction. These requirements are currently not available in most smartwatches. While satisfying these requirements will attract buyers, these requirements alone will not support a high-end (\$1000+) product offering.

1.2 Problem Definition

Smartwatches are trying to appeal to users by taking design cues from the wristwatch. Despite this, they lack the critical functions to be considered a true necessity. Garmin is in a unique position to create authentic smart instruments or tool watches that are relied on in the most extreme conditions. Current Garmin watches have complicated UI's and aesthetics that do not appeal to watch enthusiasts.

The high-end line of watches should focus on two main areas of improvement:

1. **Aesthetic:** The design and materials will need to appeal to the watch enthusiast. The designs should focus on the existing watch market segments and users. The

watches will have an easily changeable aesthetic through different bezels, buttons and other components that can create a range of looks.

2. User Interface: A rotating bezel with a circular based user interface will create a simpler and more interactive experience for the user. The rotating bezel would control the UI by zooming in and out on maps, setting bearings for the compass, entering data and many other tasks. By adding a rotating bezel the total number of watch buttons can be reduced from five to three. Five buttons makes the watch look like a digital device whereas three buttons is an accepted watch industry norm.

1.3 Leaving Apple Watch

The graph below lists the reasons people gave after they stopped using their Apple Watch. People gave up on the Apple watch mainly because it was not necessary. The excitement faded after they realized

it was mostly a fun toy. Garmin can tailor it's line of high-end watches to be mission critical for the user it is designed for. A true professional tool.

1.4 Smartwatches: The Wild West

Smartwatches are proliferating in staggering numbers searching for the right mix of design, features and price. Tech companies are trying to master physical watchmaking while watch companies are trying to better understand silicone and apps. There are three main categories of smartwatches. Techy, Tech+Traditional, and Traditional.

Techy smartwatches often have a square display and a futuristic design. They look like a piece of technology on your wrist and are proud of it. Many sacrifice the overall look for a feature based UI.

Some watches focus on a mix of tech and traditional to create a

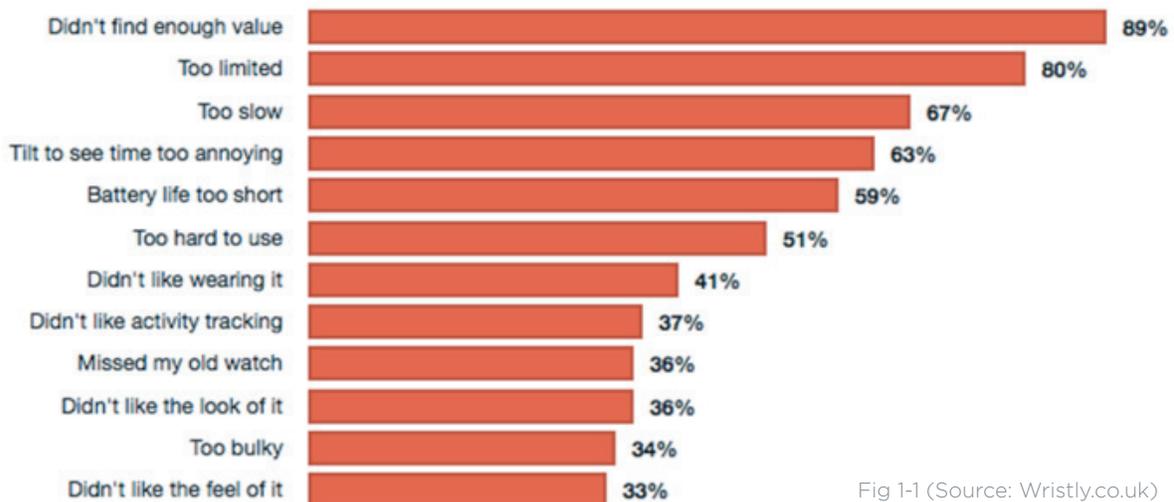


Fig 1-1 (Source: Wristly.co.uk)

watch that has a smartwatch feel without being “nerdy”. The front of these watches are still dominated by the display but incorporate some traditional watch elements like lugs for straps and other bezel details.

The traditional inspired smartwatches try their best to hide the fact that they are a smartwatch. Some place the “smart” components in the band or behind the watch so that at a glance you cannot see the smart features. Others take an existing watch design and put a display on it

How did we get to this smorgasbord of smartwatch options?

HISTORY

2.1 The Swiss Tradition

The Swiss watch industry has prided itself on precision and craftsmanship for centuries. Watches were sold based on the accuracy of timekeeping and other innovative features such as automatic winding, chronograph, and waterproofing that pushed the watch industry forward. Craftsmanship was embodied by the durability of the piece and accuracy of timekeeping.

For centuries the Swiss watch industry has crafted intricate mechanical movements. Patek Philippe makes the first wrist watch in 1868 pioneering the perpetual calendar, chronograph, and other innovations. During the first World

War soldiers needed access to their watches while their hands were full. This created a large demand for wrist watches and helped break the conception that men only used pocket watches. By the 1930’s the ratio of wrist watches to pocket watches was 50:1.



Fig 2-1 (Mechanical Watch)

The quartz crisis of the 1970’s almost drove the Swiss watchmaking industry into extinction. Using a quartz crystal resonating at 8,192HZ instead of a balance wheel oscillating at 5 beats a second. The precision that had defined extremely expensive Swiss watches was surpassed by a very cheap alternative in the quartz crystal. The industry had to rebrand themselves and appeal to buyers on emotion vs selling on superior performance.

In 2015 the industry faces another major threat from technology: smartwatches. Smartwatches take all the things we love about our smartphones and try to cram them onto our wrists. Notifications, directions, and access to all types of

information is right on your wrist. While there are many drawbacks to smartwatches like daily charging, display limitations, and concerns of obsolescence, technology marches forward at a rapid pace addressing these issues posing a real threat to traditional watches.

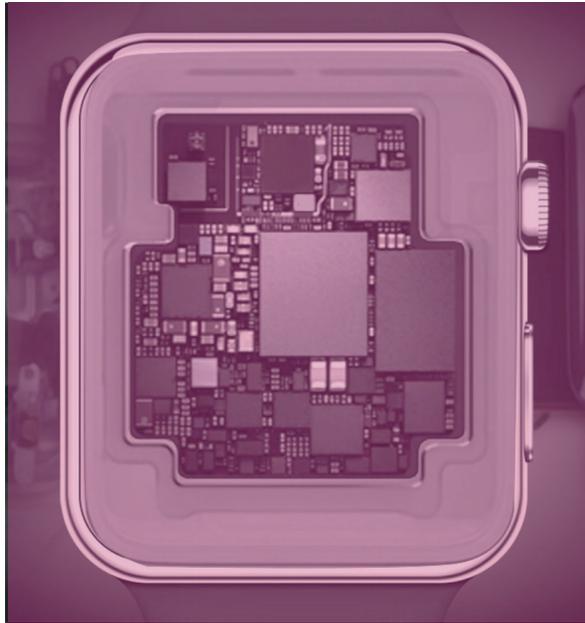


Fig 2-2 (SmartWatch)

2.2 The Instrument Watch

Watches began as basic timepieces and evolved into activity specific instruments. Features varied from tools like the tachymeter for calculating speed and distance to the slide rule bezel which helped aviators and seaman make navigational calculations. Compasses were added to adventure watches to aid explorers in getting to where they needed to go. People were willing to pay large amounts of money for these tools as they were seen as a possible matter of life and death. Mission critical tasks on land, sea, and air all utilized activity focused watches for

recording and calculating data during their activities. Historically flying, sailing, racing and exploring are some of the most exciting and dangerous activities known to man. Timing and navigation are key parts of this history. As technology began to replace these simple tools the features became more of an emotional statement as opposed to truly useful. No one is better positioned to use technology to once again create a useful tool on your wrist.

2.3 Evolving Wrist Based Calculations

The tachymeter, slide rule, compass and other bezels were considered Hi-Tech until the 1960's. Watches that featured these functions were the most advanced in the world. Today entire computers fit inside watches. GPS remains a key feature for off the grid exploring and adventures.

High tech 1960's included a rotating bezel with second and hour timer, tachymeter, and chronograph. High Tech 2016 includes a web connected interface, heart rate, smart features, GPS, sunlight readable display, 9 axis gyro, bluetooth and magnetometer.



Fig 2-3 (Evolution of wristwatches)

Opportunity

3.1 Embrace the Heritage

Garmin is uniquely positioned to blend its technology into the traditional watch aesthetic. Today's smartwatch offerings are mostly made for use indoors. Garmin's watches are purchased for their ability to survive outdoor activities. Our differentiation from mainstream smartwatches comes from the demanding needs of our users. Some of the users we support include alpinists, runners, endurance athletes, hikers, xc skiers and swimmers. These people find themselves in extreme environments requiring waterproofing, sunlight readability, long battery life, and durable construction.

3.2 Two market approaches

Technology must be integrated into the watch for it to be called a "smartwatch". In its simplest form there are two main strategies being taken to bring technology into the watch. One is to make the smartwatch look as high tech as possible and sell it based on its features and hi tech appearance. Another is to blend technology into traditional watch aesthetics.

There are four traditional watch markets: Adventure, Aviation, Racing and Dive. These watches inspire and serve outdoor adventurers, pilots, car enthusiasts and divers. Garmin's product offerings align nicely with these markets. Garmin currently

makes products that serve the outdoor, aviation, driving and marine communities. Introducing new watches in these areas is not a huge stretch as connections already exist for marketing and distribution.

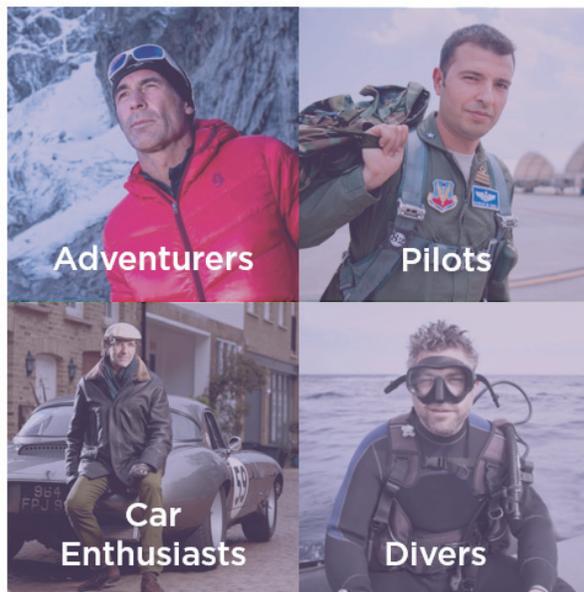


Fig 3-1 (Target Customers)

3.3 The watch enthusiast: A new customer

Garmin's current customer focuses on performance, features, and pricing as deciding factors for their purchase.

To be successful with a line of high-end watches a new type of customer needs to be targeted: The watch enthusiast. Watch enthusiasts have a different set of values from the more typical active user. They value the following things:

1. **Personal Expression**-This is manifested through the design of the watch, the image being marketed, and the brand.

2. **Craftsmanship**- This is created through mechanical complexity, materials and manufacturing.

3. **Eclusivity**- Rarity, innovation and service are all factors in creating an exclusive watch.

To appeal to the high end watch market watch enthusiasts as users need to be cRaonsidered in addition to athletes or other active users. A high end watch line cannot attract people based on features alone as these are available at lower price points. A premium watch must attract based on personal expression, craftsmanship and longevity.

water. While they aren't testing the limits that the watch is capable of the mere fact that it is in fact rated to do extreme things is appealing. The design and marketing of Garmin's high-end watches should speak to this aspirational desire to be a more exciting version of ourselves.

This idea is exemplified in the pop culture film *The Secret Life of Walter Mitty*. Walter is stuck in a boring job daydreaming about more exciting possibilities. The Bell and Ross ad shows a fighter pilot wearing one of their watches.

Market

4.1 Aspirational Positioning

Watch companies making professional high-end watches use aspirational marketing to appeal to customers. This is design and marketing based on who we want to be (exciting) vs who we are (boring).

We can't all be fighter pilots but that doesn't mean we don't all aspire to something more exciting in our lives. Watches are one way to live out this fantasy of using a mission critical tool for important activities. While most dive watches are rated to 300 feet of water resistance the vast majority sit on people's nightstands or wrists never being exposed to salt



Fig 4-1 (Aspirational Imagery)

People aspire to be more than they are and companies selling luxury items need to make them as compelling as possible to command a premium price.

4.2 Watch Market Profits and Gaps

Swiss watch exports have been growing over the last five years despite a recent downturn. Demand for these watches is mainly seen in Hong Kong followed by the USA, Switzerland, China and France.

Global watch profits are concentrated in the high end of the market. While profits are largest in

the high end (\$5000+) market they only represent 4% of the total number of Swiss watches sold.

The brands that dominate this area of the market are Rolex, Audemar Piguet, and Cartier. On the other side of the spectrum assorted fashion brands account for 82% of all shipments but only 13% of the total profits.

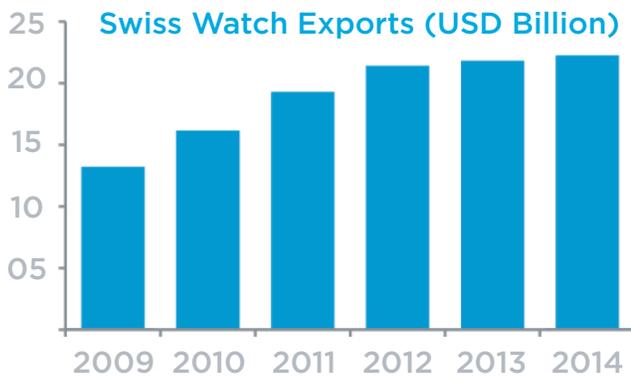


Fig 4-2 (Source: Swiss Federation FH)

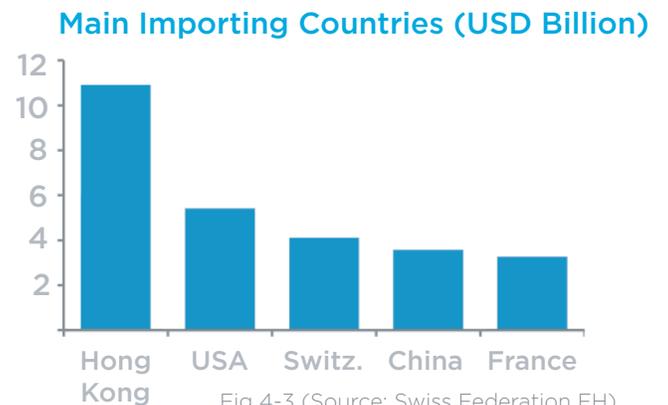


Fig 4-3 (Source: Swiss Federation FH)

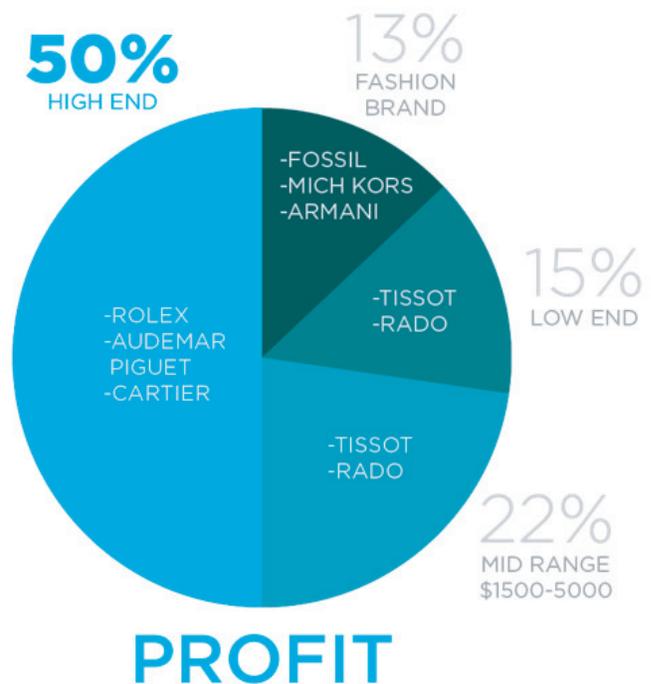
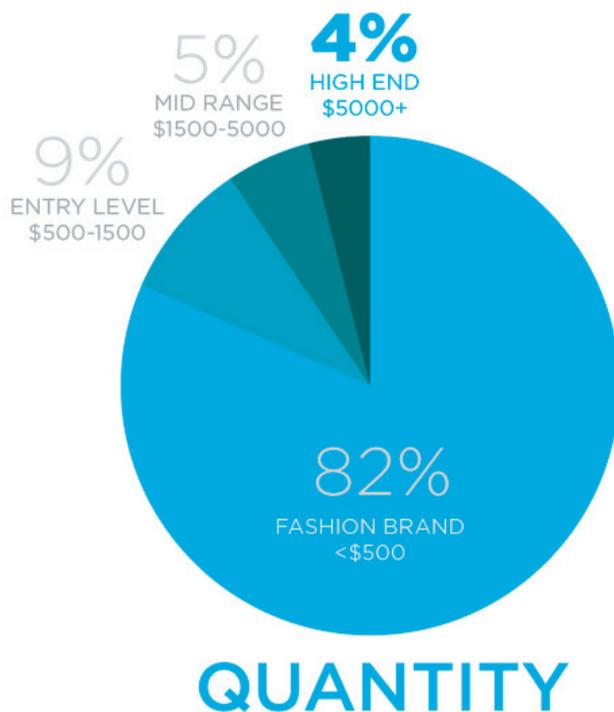


Fig 4-4 (Source: Great British Watch Co.)

The question remains is there room enough for Garmin to enter the high-end market?

The market is segmented into two axis. Recreational to Professional and Mechanical to Technological. Relative size and influence of each brand is shown with circles. Most of the technology based watches focus on the casual side of the market. The Professional Mechanical watches are all very old and established brands. The threat from this group would be if they are able to incorporate technology into their offerings. The best example of this to date is the Tag Heuer Carrera Connected. This represents the build quality expected from a Swiss

brand with a high level of technology. While the hardware appears professional the software is exactly the same as what you would find on a \$150 Android Wear smartwatch.

There are very few companies currently playing in the Professional/Technological sector. This gap in the professional side of the technological watch market is an area that Garmin could exploit.

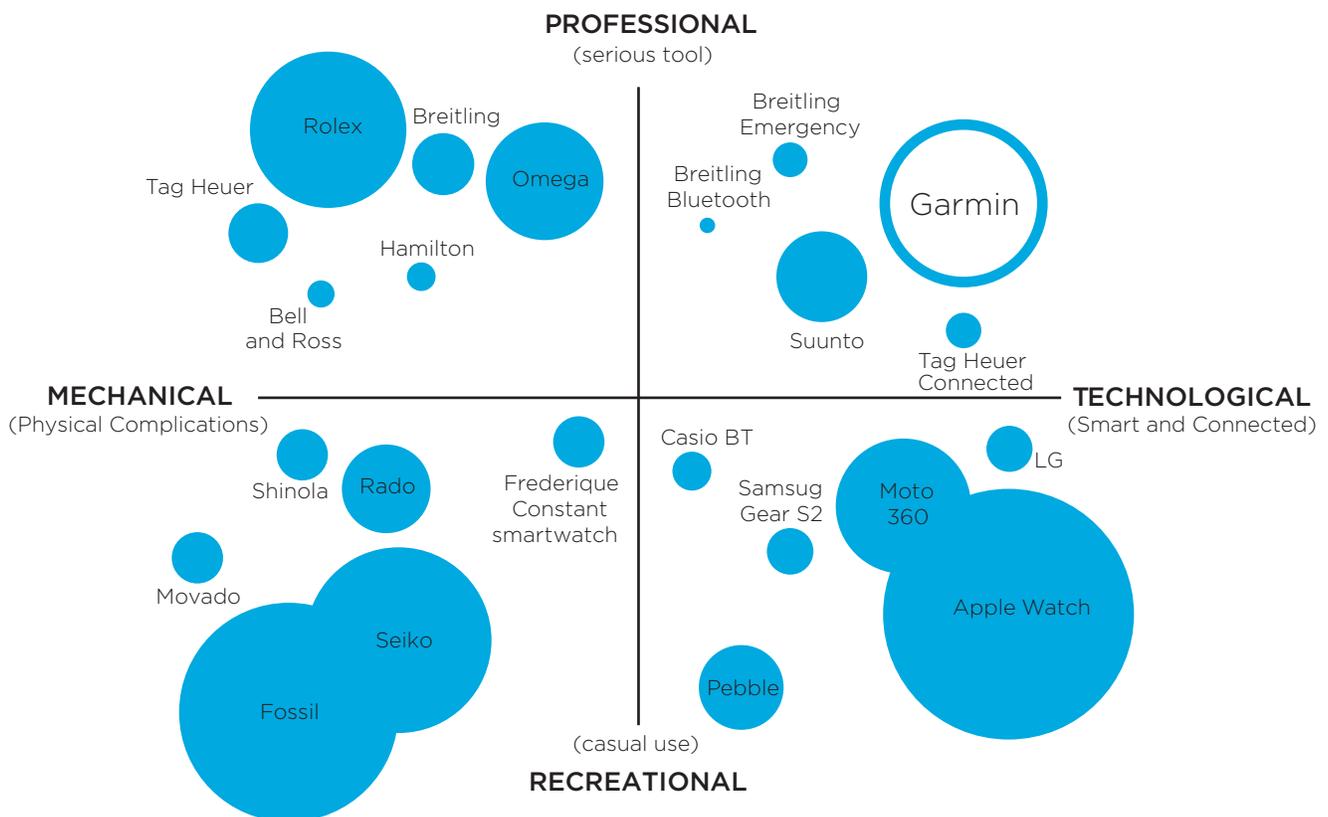


Fig 4-5 (Market Gap)

4.3 Market Disruption

Traditional watches are ripe for disruption. People will spend huge amounts of money for the right gear, training and supporting material if it is desirable and necessary. There have been some attempts, but very few watches have positioned themselves as a real “instrument” necessary for the activity. Most only focus on the theme of the activity through the look and feel of the watch. Combining the visual theme with real and useful activity specific features is powerful.

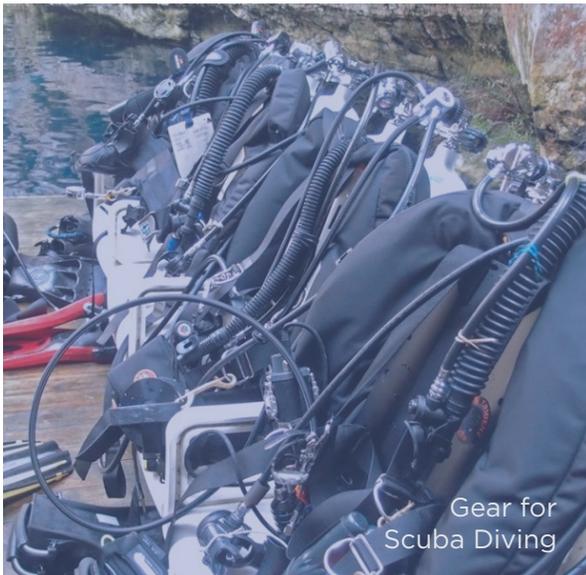


Fig 4-6 (Gear for Scuba Diving)

4.4 Top sellers and key attributes

What trends exist in successful luxury watches that can be leveraged in creating a new watch lineup?

The three best selling luxury watches of 2013 were the Tudor Pelagos, Rolex GMT-Master II Day/Night, and the Omega

Speedmaster Dark Side of the Moon. Interestingly enough the watches are spread evenly over the three most popular watch market categories of Dive, Pilot, and Race watches.



Fig 4-6 (Source: Forbes; Top Selling Watches of 2013)

These three watches share many key elements that could be learned from in creating a new high-end watch line.

These watches share the following attributes:

Bold Design- Eye catching designs let the watch stand apart from the competition and accentuate the purpose of the watch. For example Dive watches are designed to be large and chunky signaling they can withstand extreme pressures.

Activity Specific- Each watch has a different personality and functionality that is recognizable at a glance. This makes an activity specific statement.

Neutral Color Scheme- Restrained color schemes work in any situation. Watches are one of the only types of jewelry worn by men. The flexibility of a neutral color scheme is appreciated.

Rotating Bezel- Bezels rotate for different functions. This speaks to the technical nature of the watch as well as show a level of craftsmanship.

Premium Materials- Ceramic and

titanium are perfect examples of exotic materials that show performance and exclusivity. **Innovation-** Enthusiasts buy high-end watches with claims of using innovative methods and new features. This is part of the mentality of wanting the best.



Fig 4-7 (Successful Attributes)

These characteristics embody what the watch enthusiast is looking for. The first three attributes speak to Personal Expression. The rotating bezel and materials speak to craftsmanship. Finally the innovative self adjusting clasp speaks to Exclusivity.

4.5 Applying key attributes

How does Garmin apply these attributes to a smart instrument watch? There are two possible

paths: Trying to reinvent the wheel or evolving current offerings.

Reinventing the Wheel: One approach in creating a new product is to eschew established norms in the industry and try and create a new paradigm. To make this successful market timing must be just right. Your product must be so compelling that people are willing to abandon existing norms.

People often reject products that go against long established social norms. An example of this can be seen in Google glass. It was a spectacular failure. While the technology is impressive it disregarded long held social norms for fashion and etiquette. People were unsure of when you were actually interacting with them and when you were interacting with the device. Trying to drastically alter the appearance of eyeglasses has been rejected by consumers.

This approach to developing a new product should be avoided for a new high-end watch line.



Fig 4-8 (Google Glass)

Evolve Current Offerings: The desired approach would be to create a modern twist on classic themes.

Most successful products build off of existing product archetypes. They do not try to completely reinvent accepted social norms. The two examples to the side build off of existing product architectures that have been around for many years. While Swype is a new way to type, it still uses the QWERTY keyboard which dates back to 1868. Nest went back to an iconic thermostat design from half a century ago. Successful products take established winning characteristics and give them a modern twist.



Fig 4-9 (Swype and Nest)

CONCEPTS

5.1 Single Platform

Build one watch platform to create Adventure, Pilot, Driving and Diving watches. Hardware and software would reuse the same core features but change forward facing parts to create a customized experience.

The inner ring is stationary while the outer ring rotates for UI interaction.



Fig 5-1 (Exploded View)

5.2 Fenix Chronos

GPS Adventure Watch

Bezel- Rotating bezel with oversized grip details. 60 minute markings with 2 tone color scheme.

Straps- Integrated segmented rubber strap for maximum flexibility in harsh conditions.

Face- UTC time and battery dials. Altimeter and date for practicality. **Lens-** Domed sapphire extends beyond the metal bezel to allow extra doming on edges for extra light play.

Crown- Knurled button with sapphire inlay creates a 3D effect with the Garmin delta prominently displayed.



Fig 5-2 (Fenix Chronos)

Fenix User Interface Concepts

Outdoor Maps: Navigating in the outdoors can be critical to choosing a safe and expedient course. Maps provide situational awareness and keep you on track. Most outdoor watches do not use a touchscreen

due to size limitations, gloved use, and challenges with GPS antennas. Using maps without a touchscreen can be challenging since buttons are often unintuitive in this use case. A rotating bezel would allow smooth zooming in and out on the map for a simplified experience.

Map Zooming

Rotate bezel to adjust view



Fig 5-3 (Map Zooming)

What's Around Me?: Hikers want to know where they are and how far it is to important landmarks. Difficult terrain can make a visual check impossible. If you leave the trail it becomes even more important to know where you are and how to get to the next landmark. "Around Me" navigation allows the user to see landmarks in the area and quickly

select which one they want by rotating the bezel. Currently you must select a point of interest from a list in a menu. Visually showing where the items are and being able to scroll through them on the map conveys much more information as well as creating an immersive experience.

"Around Me" Navigation

Rotate bezel to desired position



Fig 5-3 ("Around Me" Nav.)

5.2 D2 Chronos

GPS Pilot Watch

The D2 Chronos captures the authentic pilot feel with time tested materials and elegant curves.

Bezel- 24 Hour Timer: Shows Current UTC time.

Straps- Heritage leather with hand stitched and waxed thread

Face- Altimeter displayed and prominent 24 hour pointer

Lens- Domed sapphire extends beyond the metal bezel to allow extra doming on edges for extra light play.

Crown- Sapphire inlay creates a 3D effect with the Garmin delta prominently displayed.



Fig 5-4 (D2 Chronos)

Situational Awareness



Fig 5-5 (Situational Awareness)

Situational Awareness: Aircraft have multiple backups for safety reasons. Pilots also like to have an extra GPS in case something goes wrong. Being able to choose the nearest airport and navigate to it can be life saving. Zooming in and out of the map should be a simple process in

this stressful situation. The rotating bezel allows the pilot to easily change map size, view available airports, and select the one they want.

5.3 Quatix Chronos

GPS Dive Watch

The Quatix Chronos embraces the nautical theme with the impervious titanium material and tide charts.

Bezel- 60 Minute Markings with rotating bezel on the outside

Straps- Titanium and Rubber hybrid strap with ratcheting clasp. This allows for easy adjustment over wetsuits.

Face- Oversized markers for improved visibility. Tide information

reminds you where you'd rather be. Lens- Domed sapphire extends beyond the metal bezel to allow extra doming on edges for extra light play.



Fig 5-7 (Quatix Chronos)

Underwater Navigation Setting a Bearing



Fig 5-8 (Setting a Bearing)

Underwater Navigation: Swimming underwater can be very disorienting. Getting lost can be dangerous and frightening. Compasses are used to swim from one point to another. For instance the diver will have directions to set his compass 240 degrees and swim 100 yards away to the next point. A rotating bezel

quickly allows users to set a specific course which will be displayed directly in front of them. If they deviate from this course their arrow will begin to shift off course. This allows them to see any deviations clearly and quickly. A backlight makes it highly visible.

5.4 A4 Chronos

GPS Driving Watch

The Quatix Chronos embraces the nautical theme with the impervious titanium material and tide charts.

Bezel- Tachymeter with black DLC coating.

Straps- NBR Rubber with molded tread detail.

Face- Chronograph for precise timing of track laps.

Lens- Domed sapphire extends beyond the metal bezel to allow

extra doming on edges for extra light play.

Crown- Sapphire inlay creates a 3D effect with the Garmin delta prominently displayed.



Fig 5-9 (A4 Chronos)

Review and Share Track Data

Rotate bezel to scroll through data



Fig 5-10 (Review Track Data)

Review and Share Track Data: Car enthusiasts can review and share trip or tack data. The bezel could be used to advance screens instead of pressing buttons. The circular

nature of the UI could speak to the circular nature of the tracks that car enthusiasts get so excited about

5.5 Chronos Family

Smart Instrument Watches

The Chronos family of smart instrument watches appeals to the watch enthusiast by embracing the

heritage of the instrument watch. It also satisfies the key purchasing motivators of watch enthusiasts of personal expression, craftsmanship and exclusivity.



Fig 5-11 (Chronos Family)

Evolution of the instrument watch:



Fig 5-12 (Evolution of the Instrument Watch)

Summary

6.1 The Opportunity

The Chronos family of smart instrument watches appeals to the watch enthusiast by embracing the heritage of the instrument watch. It also satisfies the key purchasing motivators of watch enthusiasts of personal expression, craftsmanship and exclusivity.

Garmin is in a unique position to deliver an authentic smart instrument to the high end watch market. Our experience in building rugged, waterproof, and sunlight readable watches is a perfect fit for creating professional watches. Raising our build quality through crafted parts made from premium materials and combining that with unique and thoughtful user interface enhancements will allow us to make a statement in the high-end watch market.

6.2 Implementation

There are many technical challenges to overcome and resources for testing GPS with a rotating bezel will need to be assigned. UI work will also need to be done to implement a user interface that takes advantage of a rotating bezel. On a smaller scale, research in wrist based HR ergonomic geometry, lens art printing and materials research will need to be done to bring this concept to life.

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7.2 Appendices

See attached presentation