



Smart Ecosystem Proposal

For the Hong Kong Electrical Appliance Industries Association

Written by

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Why appliance manufacturers in Hong Kong should come together and collaborate in a smart appliance ecosystem

By Paul Cheng, Daniel Chun, Avinash Bharwaney

Introduction

A revolution stirs in the technology industry. Smart devices are gaining traction, and this dream building interconnectivity through smart IoT products will become an inevitable reality. Everyone is talking about smart products - a plethora of devices ranging from home appliances to wearable products like FitBit¹ are already being steadily adopted by consumers. Although these products vary in their functions, they are united by being “**connected**” and “**smart**”: the ability to collect, analyze, and transfer data by connecting with other devices and platforms – benefiting from the huge growth in mobile applications and cloud technologies. The future of this entire market and industry rests on whether or not these next generation appliance products can be engineered to achieve complete interconnectivity. From this interconnectivity stems an entire ecosystem, allowing multiple users to access aggregated data from various smart devices and make smart decisions in a number of areas, including consumption and usage, across different brands and manufacturers.

However, this desired interconnectivity is currently lacking. The reality in Hong Kong is that it is unable to capitalize on this market opportunity in a timely manner, a result of major discrepancies between products of different brands. Different brands follow unique standardization methods in terms of hardware and software specifications and protocol. As there are so many players in the electronics and technology market, there are therefore as many inconsistencies as the number of protocols and solutions; this has delayed a much needed consensus on protocol and specifications. By the time a consensus is made, it may be too late to capitalize on the market and we could lose out on this potential growth period. This proposal has been prepared as a call for action, in hopes to motivate Hong Kong, various SMEs and manufacturers to:

1. Agree on a short-term consensus on standards and specifications, specifically regarding wireless protocol (e.g. Bluetooth Low Energy for smart living environment)²
2. Engage in the design of these new standards and specifications and actively work on developing a smart ecosystem developed by Hong Kong with a vision for serving customers worldwide.

The Market Overview on Smart Devices

With the continuous growth of key drivers for this market such as household internet connectivity and smartphone ownership, companies across the world are recognizing that this opportunity for a smart home appliance market is becoming a profitable reality. Consumers have integrated technology into their daily life, and rely on it for data collection, analysis and making smart decisions. Hence, the inclusion of smart home appliances in the mix seems very desirable from a consumer standpoint, with more than 75% of Chinese consumers embracing a

¹ FitBit is currently the market leader for wearable devices - activity tracker. (Source: IDC)

² Bluetooth SIG is currently developing the framework for Smart Environment and Remotec is a contributor in this Bluetooth Smart Environment workgroup.

need for smart home appliances (South China Morning Post, 2016). From a global perspective, the market volume for smart home-related products is currently sitting at USD 9.8 billion and is expected to grow to a market volume of USD 43 billion in 2020 (Weinswig, 2016), reiterating the growth potential involved in this market and the immediate adoptability present. Weinswig (2016) also mentions in her report that the home automation market in specific is expected to yield a market volume of USD 16.6 billion by 2020, a USD 10.5 billion increase from sales turnover in 2016.

From a local standpoint, Hong Kong is a prime location to engage in smart home appliance development. The city is already considered one of the most connected cities in the world, topping the Connected Consumer Index with a score of 1,486 points, compared to the global average of 313 (Computerworld Hong Kong, 2016). The United States of America comes in second in the world with a score of 1,062, so Hong Kong is performing relatively well. This is a good indication that consumers in Hong Kong are more receptive to newer technologies, and have a high adoption rate for higher end technologies like smart appliances.

GfK Connected Consumer Index: top ten most “connected” populations

2015 ranking	2016 ranking		Index score 2015	Index score 2016
1	1	Hong Kong	1,430	1,486
2	2	North America	952	1,062
8	3	United Arab Emirates	829	995
3	4	Norway	939	988
4	5	Germany	873	940
6	6	Kingdom of Saudi Arabia	836	935
5	7	Great Britain	856	916
10	8	Switzerland	801	914
7	9	Denmark	835	906
9	10	Sweden	807	875

Table 1. Hong Kong, North America and UAE are world’s most “connected” populations (GfK, 2016)

Although the United States is currently leading in terms of total revenue for smart home appliances, Hong Kong still has the ability to develop and grow. The United States obviously benefits from a larger population, which makes direct revenue hard to compare, but in terms of annual growth and average expenditure per household, Hong Kong scores higher. In fact, according to Statista (n.d.) revenue from smart products and systems in Hong Kong is expected to annually grow at a rate of 29.94% for the next few years, whereas the United States market is expected to grow at an annual rate of 21.49%. Furthermore, the Hong Kong’s average expenditure per household is USD 1,944.83 versus the USD 497.14 per household in the United States, which gives an indication to the great potential that is prevalent in the Hong Kong market, even when compared to consumer giants like the United States (Statista, n.d.).

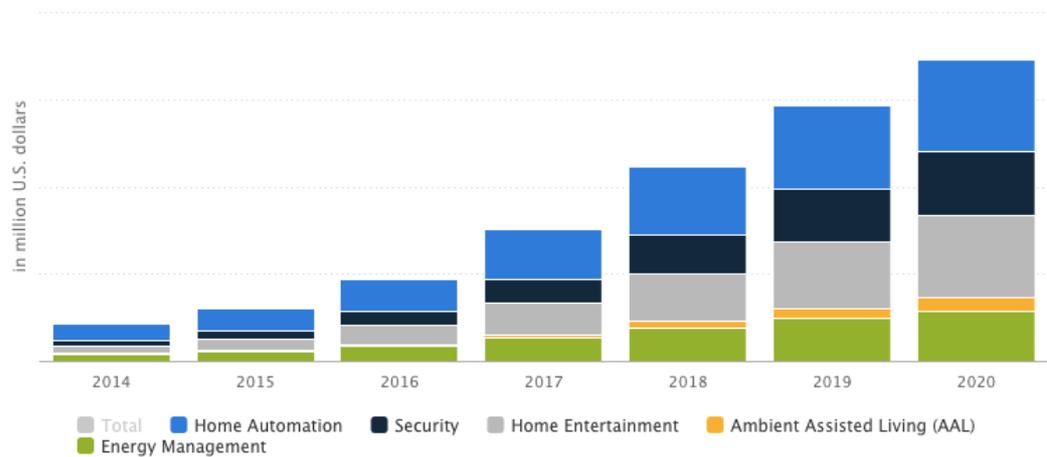


Table 2. Revenue in Hong Kong's "Smart Home" market totals USD 47.2 million in 2016 (Statista, 2015)

There are inherently going to be other factors at play but as a basic summary, high connectivity and increasing smartphone ownership in Hong Kong, coupled with the forecasted annual growth and relatively high average expenditure per household in the smart home automation market, are sure signs that the local consumer demographic is ready for innovational change. However, though all the data indicates that smart home appliances are going to be unconditionally profitable, the unfortunate reality is that there are still inherent barriers that developers and manufacturers have that are preventing the market from adoption and to reach scale.

The Challenges for Developers and Manufacturers in Hong Kong

According to the aforementioned Li and Fung report by Deborah Weinswig, home automation has been stalled due to one primary reason: compatibility and interoperability of devices. Compatibility issues and the whole user experience is lagging, simply because there are too many players in the market, each of whom use different standards, specifications and protocol (Weinswig, 2016). History tends to repeat itself and to Remotec, it seems that the home automation industry is repeating the same issues that were in place when commercial PCs transitioned to consumer PCs. The PC industry back in the day also lacked this interoperability of devices, which stagnated its growth. However, once Intel and Microsoft, the two big market leaders at the time, took control and steered the ship on behalf of the entire PC industry, the compatibility issue was solved. Microsoft and Intel introduced the "plug and play", which was a set standard that both developer and manufacturing parties had to abide by, and it is something that consumers still use today in the form of USBs (Microsoft, 1999). Similarly, Hong Kong designers and manufacturers have to take a stand and decide on an industry-wide standard that will be abided by.

In order to achieve this compatibility between different appliances, Hong Kong designers and manufacturers have to overcome two major challenges. The first of the two challenges is the aforementioned lack of consensus for industry protocol. Consumers want this interconnectivity so that they can still create a smart home with appliances from different brands and manufacturers, so there is a need there. However, as there are no specific guidelines regarding these standards, protocols and specifications, and a large number of designers and manufacturers involved, home appliances will continue diverging from one another.

The second challenge that should be overcome is Hong Kong's very passive mindset regarding industry specification development. Most Hong Kong

manufacturers do not hone in on research and development, and rather place those efforts on solely adopting tried and tested technology. The current approach is risk-averse, which can be a good thing at times. However, when it boils down to an industry that is on the verge of breaking through and skyrocketing, experimentation and R&D is vital.

Our insight from this is that the smart home appliance market will react and respond in a similar manner as the commercial PC market. Once there is a concrete solution to the compatibility issue, consumers will be able to make more use of their smart home system because only then will all their appliances connect and transfer data on one seamless platform. Therefore, Remotec would like to place emphasis on the direction Hong Kong wants to take. Should we sit back and continue being passive, or should we come together and take action.

A Case Study of an ecosystem – Avi-on

A number of companies around the world are recognizing this growing trend of smart home automation products. One such company is Avi-on and they have developed their own proprietary solution in order to capitalize on this growing market. Their smart home system was developed in the United States and initially started off as just smart lights, but Avi-on has grown into a company with a large product portfolio. However, they have recently realized that without interconnectivity, consumers did not seem ready to fully adopt the “smart” system.

Avi-on has realized that in order to survive in the market, they have to ensure that other players are on the same page as them. In order to incorporate more manufacturers and developers into its system, they attempted to initiate an organic approach where potential companies can “sign-up” to join the platform. Avi-on’s progress is commendable but one major drawback to this strategy is because there are so many players involved in the market, it will take a long period of time in order to garner enough support from companies in the industry.

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The graphic illustrates the Avi-on ecosystem: a smartphone displaying the Avi-on app interface, a plus sign, a small image of a circuit board, an equals sign, and a glowing lightbulb.

Figure 1. Adapted from Avi-on's website (Avi-on, n.d.)

Potential solution from Hong Kong for the world

Although Avi-on means well, one important takeaway from their strategy is that the solution will take long to build momentum. By approaching companies individually and gathering a database one company at a time, the eventual time cost involved is huge. Remotec believes that instead, with the help of the HKEAIA, we can setup a Hong Kong-specific SIG regarding smart home automation and together design a fixed standard that all related parties can contribute to. The benefit that comes with such a SIG is the added synergy – home automation is still a fairly large field that consists of different appliances, so different companies can still provide individual specialist views on the subject at hand.

Furthermore, we believe that adopting a fixed wireless protocol - such as Bluetooth Low Energy (BLE) led by Bluetooth SIG³ - will lead to a number of benefits. It will allow appliances from a variety of brands, designers and manufacturers to connect and interact with one another. Our insight suggests that in terms of wireless communication protocol, the two protocols that should be fixated on are Wi-Fi and Bluetooth (BT). In specific, we believe that BT BLE 4.2 and BLE 5.0 wireless communication protocol and application profiles will be utilized as the primary wireless interface. Our rationale behind supporting Wi-Fi and BT BLE as the standardized protocol used over alternatives such as Z-wave is that both smartphones and smart TVs rely are equipped with Wi-Fi and BT BLE functionality, allowing for large-scale innovation based on these two protocols.

Smart Appliance Collaboration

A smart ecosystem for consumer electronics and appliance vendors

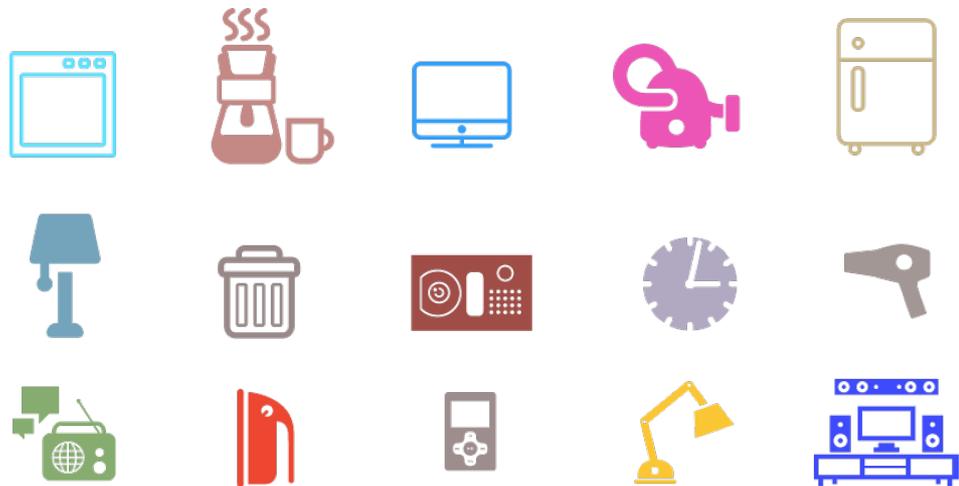


Figure 2. SmartAppliance.co project

Remotec would like to reiterate that the purpose of this is to stimulate discussion and interest among Hong Kong's electrical appliance companies and motivate the industry as a whole to get involved and provide their own insights. We hope that you have understood some of the background regarding this growing industry and contribute to the research and development of such technology in Hong Kong.

A smart appliance collaboration ecosystem developed in Hong Kong that continues to invest in R&D and technology leadership will bring the entire electronic appliance and consumer electronics industry closer to the expectations of the customers

³ Bluetooth SIG is the standardization body that handles all research and development effort in using Bluetooth technologies for integrating into consumer products – www.bluetooth.org

worldwide. Remotec would like to hear more from all HKEAIA members their opinions, views could be sent to Paul_Cheng@remotec.com.hk. Remotec is currently developing a line of products that will enter the market based on the value-proposition of providing worldwide indoor climate control – *SmartAirCon*. This project is expected to bring business opportunities for many new innovative products using BLE connectivity in the future through an ecosystem.



Figure 3. SmartAirCon project

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