

Business models based on facilities bundling: success criteria

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Abstract

Wireless access networks have become common in public facilities such as airports, hotels, cafés and restaurants. By providing wireless local area network (WLAN) access facility owners can attract new customers and create added-value for their core services. These facilities are often called hotspots. Hotspot owner can provide an open network access free of charge and thus create added-value for its core business, but often the access is provided by a 3rd party wireless Internet service provider (WISP) and bundled with the services or products of the hotspot owner. In this paper I introduce such business cases and related technological challenges.

1 Introduction

IEEE 802.11 has become a widely accepted WLAN standard family. Compared to other wireless access technologies, it provides a relatively high data rate within a short range. Public facilities have found it attractive to provide WLAN access to their customers. Most of today's laptops and personal digital assistants (PDA) are equipped with a WLAN card. Moreover, the trend of mobile phones with WLAN access becoming common makes this business interesting. Technology evolution enables new business roles to emerge. On the other hand, network convergence with variable radio access technologies (RAT) causes new challenges. For example user characterisation and traffic measurement that is required in order to understand the network requirements in certain facilities becomes complicated.

In section 2, I classify the general WLAN business models and value chain. In section 3, I introduce briefly the technologies that are crucial for the business models and in section 4 business case examples are introduced and analysed. Finally in section 5 I conclude the WLAN business model success criteria and challenges.

2 WLAN Business models

There are several business models for providing WLAN access in public facilities. The facility owner may provide an open WLAN access free of charge, typically with low Quality of Service (QoS), for its customers and thus create added value for its core business. Alternatively, it can buy the service from a 3rd party WISP and provide it bundled with its own services or products. Another option for a WISP is to offer a commercial WLAN access as its own separate service and get all the revenues. The facility owner will then attract new customers, and the WISP gets more customers.

Hybrid Operating Model for Wireless Hotspot Businesses introduces a model for providing free WLAN access for communities in public facilities [7]. The final business model is based on revenues generated from purchased products and services and localised advertising. However, in this model as proposed by Jamaluddin et al. advertising is implemented over a software application, which the user must install in order to gain access to the network. This decreases remarkably ease-of-use, which is a significant obstacle for the service adoption. Some models use localised advertising by providing only a customised authentication page and forwarding a successfully logged user to a certain web page. Implementing localised advertising at more detailed level by providing e.g. information from certain parts of mall is an interesting opportunity if always-on WLAN access will get commonly used in mobile phones. However, I do not handle any such cases in this paper.

While defining the business model, one should understand that a business model mediates between the technical and economic domains, as discussed in the paper of Mathias Tallberg[16]. Relevant technical domains related to facility bundling are among others security and authentication: facilities crowded with business users (hotels and airports) must enable secure connectivity and authentication method may be a part of earning logic. Even 3rd party authentication providers offer customised login pages in order to strengthen the

facility owners brand image. I discuss more about the technical inputs in section 3 and introduce pricing and value creation models as economic outputs in section 4. The actual business model in technology based environment consists of market, value proposition, value chain, cost and profit, value network and competitive strategy. Understanding the value creation process is as essential as understanding the real cost structure. In addition to the techno-economic macro environmental factors, social and political factors affect the final WLAN business model. Regulators have so far decelerated the adoption speed of public WLAN services, as is discussed in the paper of Niklas Tirkkonen [18]. On the other hand, limited radio spectrum is not that problematic in indoor facilities as the facility owner has the power to decide who can use is.

2.1 Value chain

Porter (1985) introduced the *value chain* framework as a basic tool for systematically examining all the activities a firm performs and their interactions [12][15].



Figure 1: WLAN Generic Value Chain

Figure 1 illustrates one model, given by Paolini et al. for WLAN Generic Value Chain. Hotspot owner negotiates deals with other players to install and maintain the hotspot. In addition, it can develop site-specific content such as localised advertising to users. The added value for hotspot owner is the increased attractiveness of the facility and ability to sell the service to customers. Network provisioning consists of hotspot setup and maintenance, and negotiating with hotspot owners or customer owners. It creates value in terms of hotspot optimization and partnerships with upstream players. Authentication and security provide interoperability and integration with mobile networks, and on the other hand enable business usage and billing. The function of billing and roaming is to establish partnerships between hotspot owners and customer owners, and integrate the WLAN service to the customer owners. Roaming enables larger coverage and customer-base, as will be demonstrated in the TeliaSonera's business case in section 4.1. Finally, the customer ownership covers customer acquisition, marketing, partnering, and integrating the WLAN service with other mobile services [12]. The value chain described above represents only a simplification of a WLAN service value system. While moving to more complicated business models, the value chains change to multidimensional value networks and should be connected to e.g. hotspot owner's core business. In addition, the technology evolution and new business roles will affect the complexity and dynamics.

3 Technology overview

IEEE 802.11b is currently the most common wireless LAN technology. Albeit it has become a de-facto WLAN standard, there are still several challenges to face until a ubiquitous hotspot infrastructure can be provided. Moreover, it should be mentioned that for example 802.11g standard defines the way wireless LAN gear communicates at up to 54 megabits per second while remaining backward-compatible with 11-Mbps 802.11b. In this chapter I concentrate mainly on the technology and deployment-related challenges related to providing 802.11b access in public facilities, which has a significant impact on the final business models. These challenges include network provisioning, authentication, security, billing and roaming. The generic value chain in section 2.1 illustrated how these challenges link to the final business model.

3.1 Technological challenges

Authentication, billing, security and coverage in public hotspots are problematic because hotspots are administrated by different providers and network accesses are configured differently. Moreover, implementing seamless handover between variable RATs and service providers will be inevitable at least at some level in terms of user experience, but complicated to implement. This problem will lead up to new business roles to emerge.

Current authentication methods are implemented either through Web-based user interface or through proprietary client software requiring installation and configuration. The easiest option is to use existing user-id's (e.g. email-address or mobile phone number) and passwords, or a well-known 3rd-party authentication provider such as *msn.com* or *aol.com*[2]. Installing software decreases the ease-of-use, but may provide better security (especially if client software for Virtual Private Network (VPN) is included) and opportunity for a Hybrid Operating Model [7]. Authentication is commonly based on RADIUS servers, which are responsible for receiving user connection requests, authenticating the user, and then returning all configuration information necessary for the client to deliver service to the user [14]. Another option is to use SIM-based authentication, provided by GSM-networks. 3G-cards in laptops and WLAN access in mobile handsets enable easy and fast authentication based on user's International Mobile Subscriber Identity (IMSI). Moreover, using SIM-based authentication enables roaming between 3G and WLAN access networks. T-mobile offers access to users through a pre-established account while e.g. TeliaSonera HomeRun offers also one-time login and password to a temporary user.

Authentication provides only user identification, not protecting the transferred data over a wireless connection. The built-in security features of 802.11 include Service Set ID (SSID), Media Access Control (MAC) Address Filtering, Wired Equivalent Privacy (WEP) Encryption and 802.1x/EAP/LEAP [4]. SSID is a weak security method which uses a string of characters to identify a wireless network. Filtering allowed MAC-addresses is neither a strong method, as the addresses can be figured out and assigned to unauthorized WLAN cards. WEP provides security based on shared keys by allowing only those WLAN cards with a valid key to access the network. However, configuring keys to a large number of users is not scalable and the encryption algorithms are vulnerable to attacks[2]. 802.1x, built on Extensible Authentication Protocol (EAP) and combined with SIM authentication is the emerging security method used by many service providers. According to TeliaSonera, deploying 802.1x and EAP-SIM enables interoperability in wireless LAN networks and easier and seamless access to services[9]. However, further development is still needed as it has been reported about flaws in 802.1x as well[4]. VPN is still the most reliable method in order to secure the connection to closed private networks.

3.2 Deployment challenges

In addition to the technological challenges, providing a sufficient QoS in terms of capacity, coverage, bandwidth, delay etc. is business critical. Network management, dynamic load management and bandwidth provisioning in the wireless network require facility-related information about users' behaviour, data-rate demands and time used in the network. Network should be able to adapt to the changing resource availability or changing traffic characteristics either statistically or dynamically and suggest some form of corrective action to the user. Understanding the deployment challenges related to network management, dimensioning and design, and cost structure incurred from network maintenance is crucial, as will be illustrated in the example case in section 4.2. Network dimensioning process (Figure 2) must be seen as a continuous process. However, although traffic characterisation in different facilities have been studied, it is not clear whether such usage models and network throughput translate to hotspots in public areas[2]. It seems that in order to produce realistic information for the futures public network services, measurement should be performed outside the networks.

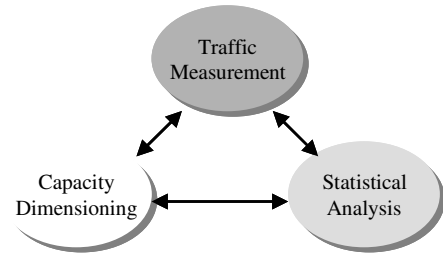


Figure 2: Network Dimensioning Process

3.3 Future vision

Network convergence and dynamics of new technologies services and business models make the user characterisation and network measurement extremely complicated. Instead of network measurements, multi-radio terminals seem the most promising place to measure usage and traffic in future [10]. Large operators and WISPs will probably have a major role in providing public WLAN access, as hotspot owners want to outsource network maintenance, security, complicated billing logics etc. However the technical challenges listed below enables new business roles for providing 3rd party authentication and billing. Internet business players such as Google and Skype already have a large customer base with existing authentication parameters. Moreover, credit cards companies have an opportunity to bundle secure authentication and cost efficient billing, as the existing infrastructure enables lower cost transactions.

4 Business cases

I use Timo Smura's classification of players in the WLAN market based on their background to classify the players in the business cases described below [15].

- Mobile and fixed line operators, providing WLAN services as a complement to their other data service offering
Examples: TeliaSonera, Elisa, Saunalahti, T-Mobile
- Greenfield operators, providing WLAN services as their main business
Examples: MobileStar
- Site owners, providing WLAN service in their own premises, both as means to tempt more customers and as a source of additional revenues
Examples: Starbucks, Hesburger, hotels and cafés in Finland

The first two cases provide operator point of views, which needs to be understood in the later examples of service bundling, since it seems that at least in Finland, most of hotspot owners want to focus on their core business and bundle their services with outsourced WLAN service. In addition, providing a commonly used service such as TeliaSonera HomeRun is more valuable

for the hotspot owners, whose customer's are already HomeRun subscribers.

4.1 TeliaSonera HomeRun

TeliaSonera is the leading telecommunications company in Nordic and Baltic area. Its product HomeRun offers Internet connectivity in public locations such as hotels, conference centers, cafés, restaurants, train stations and airports. HomeRun aims to enable large coverage of Internet Access Points (AP) for business users. Although the wide infrastructure ties significant resources and target customers except high QoS and user support, this segmentation is supported by the fact that majority of WLAN service revenues will come from places with a lot of business users[4]. Homerun's large coverage (over 25,000 locations) is achieved through bilateral partnerships and roaming agreements with international WISPs[17]. Pricing is based on usage or time (short time or monthly fee). In addition to regular Internet access, TeliaSonera provides e.g. VPN solutions for secure access to company's intranet and SMS-service for exploring the nearest access point.

Table 1 lists the HomeRun hotspots by location. 58% of the hotspots are located in hotels and conference centers, where business users are present. In some hotels, HomeRun service is included in the hotel room price. Although airports and train stations cover only 5% of the sites, they are crowded with waiting business travellers. Due to roaming agreement with Connexion-by-Boeing, HomeRun service is also available on all airplanes on long haul SAS flights and many flights run by Lufthansa, ANA and Japan Airlines[17]. In addition, the service is provided on some ferry connections between Helsinki and Stockholm.

Table 1: Commercial HomeRun WLAN hotspots (14.10.2006)

| Hotspot type | Sites in Finland | All sites |
|-------------------------------|------------------|-----------|
| Hotels and conference centers | 149 | 601 |
| Airports and train stations | 25 | 49 |
| Restaurants and cafés | 9 | 112 |
| Motorway services | 9 | 47 |
| Exhibitions and sport grounds | 8 | 27 |
| Companies | 20 ¹ | 93 |
| Public places | 9 | 115 |

When HomeRun was first launched as Swedish Telia's service, it suffered from high price and therefore lack of

¹ Major part of the companies represented TeliaSonera's own offices or stores.

subscribers [4]. Offering WLAN access to business users where ever they are requires significant investments on infrastructure and QoS. On the other hand, in order to cross the chasm (Figure 3) and get a new technology product to the mainstream markets, number of customer references and hotspots are needed[11]. To get more subscribers for a commercial WLAN service, large coverage is required, which TeliaSonera has later achieved via its wide infrastructure and roaming agreements with other WISPs.

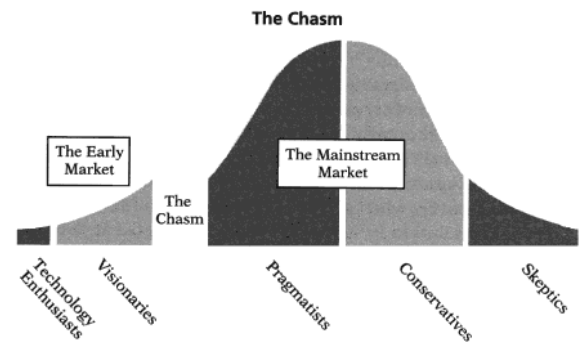


Figure 3: Technology adoption curve

What makes HomeRun a successful business?

HomeRun is an attractive option for the service bundlers (facility owners) as it has a large coverage of other hotspots and therefore large base of subscribers who are willing to use HomeRun as their prior WLAN access provider. TeliaSonera's subscribers can combine HomeRun service with TeliaSonera's other offering. For TeliaSonera, existing core network infrastructure enables cost efficient operating. In addition, right market segmentation has been crucial.

4.2 Starbucks, MobileStar and T-Mobile

Starbucks Corporation is a leading retailer, roaster and brand of coffee, located in 37 countries world wide. In January 2001, an American WISP MobileStar announced a strategic deal with Starbucks, Microsoft, IBM and Compaq, of which MobileStar assumed most of the risk and cost. Their vision was to provide broadband access hotspots over all The USA [4]. MobileStar deployed the hotspots in cafés and received all revenues from the service. For Starbucks the model offered more customer potential by enabling Internet usage while enjoying its products. MobileStar did not understand the network dimensioning and the total cost structure caused by scaling the network to a nationwide level. Moreover, additional costs incurred from building and maintaining fixed T1-lines to all the agreed Starbucks facilities. MobileStar lacked from subscribers partly because of poor marketing and early market phase. In October 2001 they failed to receive more funding and went bankrupted [21].

MobileStar was bought by Deutsche Telekom and connected with its subsidiary, a multinational mobile phone operator T-Mobile, which has over 90 million subscribers in Europe and USA and over 7000 hotspots in USA [22]. WLAN access is still provided in Starbucks cafés, but no bundling is performed so far. T-mobile participates the 3GPP's Unlicensed Mobile Access (UMA)[20]. This combined with large hotspot coverage enable optimal mobile services from the user point of view. As Todd Achilles, director of handset product management at T-Mobile, puts it: *"The device automatically notifies you as you enter a Wi-Fi hot spot and switches to the fastest network available, allowing you to maintain your Internet session as you travel from your home, to Starbucks, to the airport, to a business meeting and to your hotel."* [23]

4.3 Hesburger

Hesburger is a Finnish fast food chain with about 200 restaurants in Finland and Baltic countries. Its turnover was about 125 MEUR in 2003. According to their Internet page, 100 000 customers patronize daily in their restaurants [6]. The company is known of its well defined concept and using its brand to bundle services. In addition to fast food restaurants, Hesburger runs a virtual mobile operator, hotel, cafés, car washes, and home product services. With a member card, customers can receive bonus from their shopping and get benefits based on the 'earned' membership level. The level depends on the amount of shopping. Many of the facilities are equipped with WLAN access. Table 2 illustrates how the HeseWLAN service is bundled with other Hese-services.

Table 2:HeseWLAN prices (14.10.2006)

| Membership level | Free time (min/day) | WLAN Price EUR/min |
|------------------|---------------------|--------------------|
| Bonus card | 10 | 0,10 |
| Silver | 30 | 0,10 |
| Gold | 60 | 0,10 |
| Platinum | 120 | 0,10 |

WLAN access is operated by DNA Finland – a competitor to TeliaSonera and Elisa. HeseWLAN is provided in over 100 facilities owned by Hesburger. In addition, DNA Finland provides the service to non-member customers with a price of 3EUR/30min. Alternatively customer may use the service with her existing DNA WLAN subscription. The partnership between Hesburger and DNA Finland generates a 'win-win-situation' for both parties; DNA Finland gets more subscribers for its existing infrastructure and Hesburger gets added-value for its core business and increased sales via service bundling without significant investments or risks.

The business model success criteria is composed of existing network infrastructure, customer bases, brands and facility network and bundling attractive services for a specified customer segment.

4.4 Hotels in Finland

This section illustrates how WLAN access is provided for the hotel guests in Finland. The analysis is based on interviews with persons responsible for the service offering in three different hotel chains. Hotel Kämp is a five stars hotel located in the centrum of Helsinki. It belongs to the Starwood Hotels & Resorts -chain, which segments to luxury accommodation. Typical guest is a celebrity or a business customer in very high position. An open WLAN access is available in the hotels public spaces free of charge and both TeliaSonera's and Elisa's accesses are provided in meeting rooms. Currently HomeRun is available in hotel rooms with price of 50EUR/day. According to the General Manager Timo Tirri, there will be changes in pricing and access provider in hotel rooms. However, Starwood Hotels & Resorts policy defines that no free access will be provided in the hotel rooms[19].

Restel Consolidated runs 43 hotels in Finland with brand names Crown Plaza, Cumulus, Holiday Inn, Hotelli Seurahuone Helsinki, Ramada and Rantasipi. Its target customers vary from families and holiday guests to business customers. They offer the HomeRun service with a price of 15EUR/day for their guests. In addition TeliaSonera has made investments for the WLAN infrastructure in Restel hotels. According to IT Manager Esko Alarvo total bundling by providing the service with the hotel room price is under consideration[1].

Radisson SAS Hotels & Resorts chain belongs to Reziror SAS Hospitality, which runs totally 133 hotels. Typical guests are travelling business customers. Radisson SAS aims to provide free Internet access in all their hotels. In Finland, all hotel guests can get HomeRun service while checking in to the hotel. According to the Development Manager Marja-Liisa Järvenpää, the bundling has been a success. Compared to the earlier model of chargeable HomeRun service, total bundling creates much more value for their customers[8]. Moreover, offering access to the service which the guests already subscribe is valuable for both the operator and facility owner.

4.5 Roberts Coffee

Roberts Coffee is the leading coffee shop chain in Nordic countries with nearly 50 cafés in Finland, Sweden, Estonia and Denmark. Its concept Netcup offers Internet access for the cafés customers. Six Netcup cafés in Finland offer also free WLAN access. Once a customer buys a product, she gets a one-time username and password for accessing Saunalahti WLAN service.

When the customer logs in, she will be forwarded to the Netcup web page. After 15 minutes, the account expires and the customer will be automatically logged out. Customer can then purchase new café products and get new WLAN access with it. According to Beatrice Björklund responsible for Roberts Coffee business sales, the investment has been profitable as the service has number of users[3].

5 Conclusions

WLAN is a widely accepted network access method, and its importance will grow as the mobile handsets are equipped with 802.11 radio interface. WLAN technology offers inexpensive investment on facility's attractiveness. However, making successful business by providing WLAN access in public facilities depends on right customer targeting, attractive service bundling and understanding the real value creation process and cost structure. The successful business models are often based on partnerships with existing network infrastructure, brands, facilities and customer bases. In addition to charactering the facility users, traffic measurement is essential. Technology evolution enables new business models and roles to emerge. However, there are still number of challenges to face in order to manage the end-to-end usability. It is interesting to see, when facilities will bundle new services, such as free VoWLAN calls with a cup of coffee. What are the required actions and business roles for implementing such service bundling?

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