

Myths about the Hearing Aid Market

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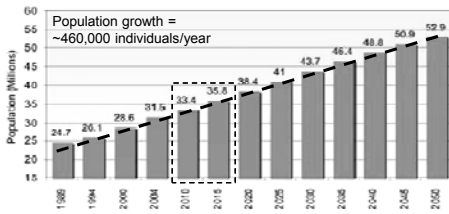
Hearing Aid Market



Myth 1: Hearing Aid Market is Underserved



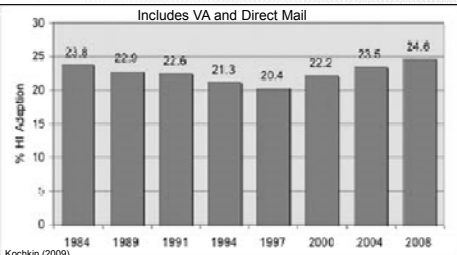
BHI Estimates of Hearing Impairment



Kochkin (2009)



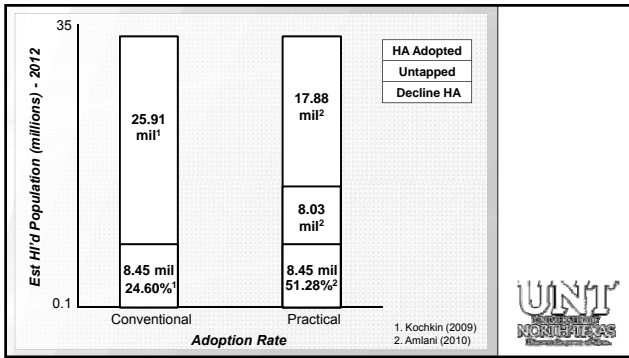
BHI Adoption Rates



Kochkin (2009)

Adoption Rate in 1981= 17.5% (Amlani & De Silva, 2005)






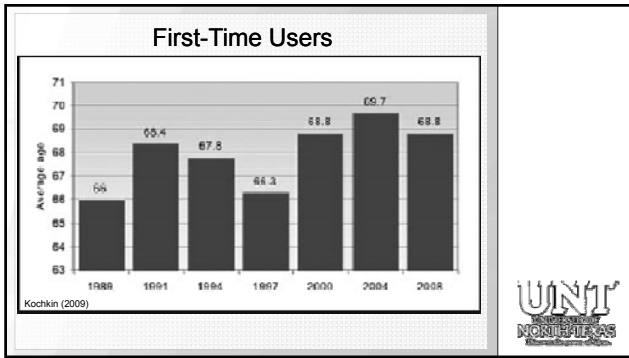
Myth 1: Hearing Aid Market is Underserved

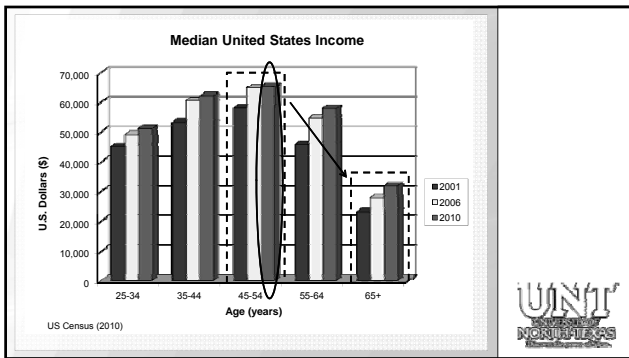
- MarkeTrak VIII data portrays the hearing aid market as underserved because it includes all listeners with some form of hearing loss
 - This perception of an underserved market is one reason that Internet Sales, Third-Party distributors, and even Insurance companies are attempting to gain market share
- Using an economic model, the present-day practical adoption rate is estimated to be slightly above 51%
 - Estimates suggest that the market can grow by a maximum of 27% under ideal conditions

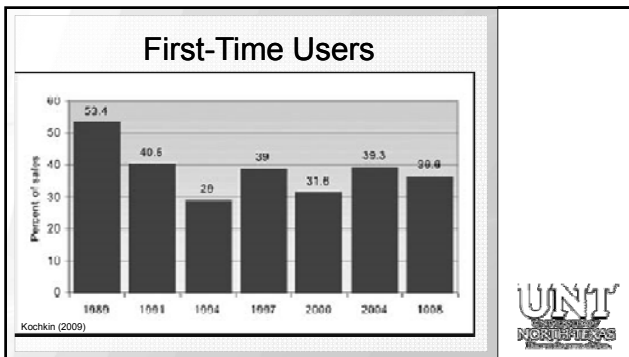


Myth 2: Price is the **Primary** Barrier to Adoption Rates

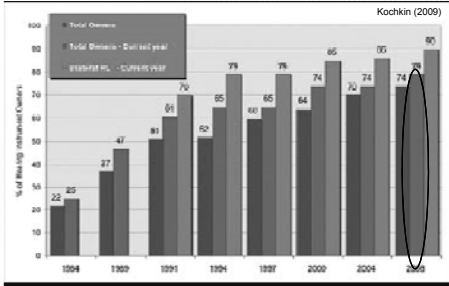








Binaural Rate



Price as a Primary Barrier

- MarkeTrak VI (Kochkin, 2002)
 - ~ 85% of consumers desire lower prices
 - Rank order of hearing aid improvements:
 - Understanding speech in noise
 - Better sound quality
 - Reduced feedback
 - Lower prices

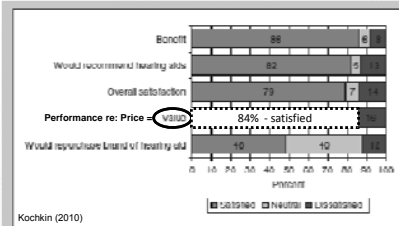


Price as a Primary Barrier

- MarkeTrak VII (Kochkin, 2007)
 - Nearly 30, out of a possible 100, respondents indicated that financial or value considerations impacted their decision not to obtain hearing aids
 - Of the 30 respondents, nearly 7 respondents out of a possible 100 respondents (i.e., 22%), indicated they could not afford hearing aids



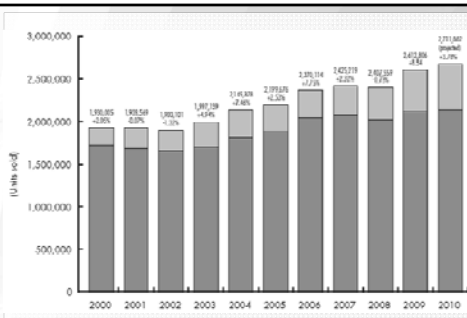
Price as a Barrier



Kochkin (2010)

Figure 4. Consumer satisfaction with hearing aids: over all indices where hearing aids are ≤ 4 years of age.





Kirkwood (2010)



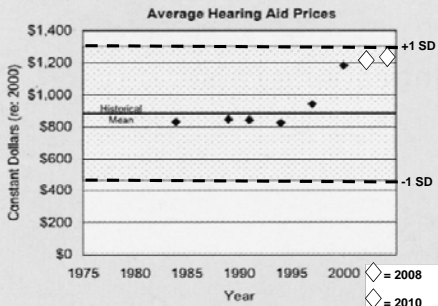
Myth 2: Price as the Primary Barrier

- Price is a consideration for procuring devices, just **NOT** the most important one
 - Most listeners are more concerned with the ability to hear with their device(s)
 - Price prohibits hearing aid procurement for 30% of the hearing-impaired population, with 7% of the hearing-impaired population unable to afford this technology



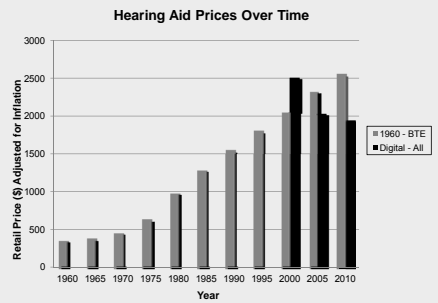
Myth 3: Hearing Aids Are More Expensive Today than in Previous Years?





Adopted from Lundeen (2004)





Adopted from Doyle (1980)



Myth 3: Hearing Aids are Too Expensive

- The retail price of hearing aids is not significantly different than it was 50 years ago
- In addition, the retail cost of hearing aids have increased at a rate below that of inflation



Myth 4: Technology will Increase Adoption Rates



BHI Adoption Rates



ADVERTISEMENTS SHOWN TO RESPONDENTS IN GROUP 1

- 100K Digital Signal Processing
- Bluetooth
- Free ear Microphone & Memory


ADVERTISEMENTS SHOWN TO RESPONDENTS IN GROUP 2

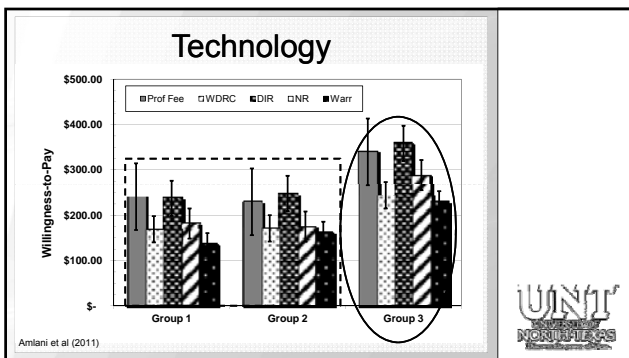
- 100K Digital Signal Processing
- Bluetooth
- 100% Battery Life
- Adaptability Across All Sizes
- Adaptive Noise Reduction
- Adaptive Feedback Control
- Free Ear Microphone & Memory

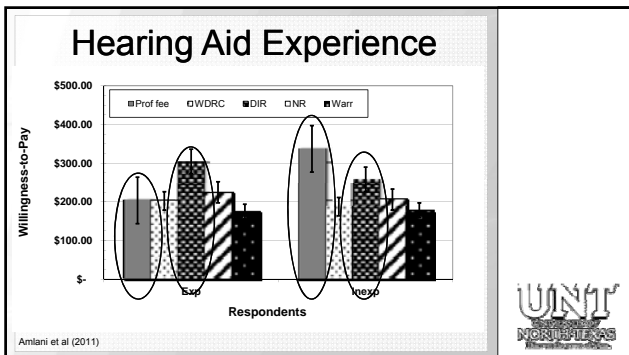
ADVERTISEMENTS SHOWN TO RESPONDENTS IN GROUP 3

- 100K Digital Signal Processing
- 100% Battery Life
- Adaptability Across All Sizes
- Adaptive Noise Reduction
- Adaptive Feedback Control
- Free Ear Microphone & Memory

Amlani et al (2011)







Myth 4: Technology will Increase Adoption Rates

- Stagnate growth over past 30 years, despite marked increases in technology
- Promoting technology in terms of user evidence-based benefit increases willingness-to-pay
- Two different niches
 - Experienced users - Technology-driven
 - Inexperienced users - Service/rehabilitation driven



Myth 5: Unbundling Prices Will Decrease Adoption Rates



Feature	Pure Price Bundling	Partial Price Bundling	Price Unbundling
Hearing Aid	\$2200.00	\$2000.00	\$500.00
3 Memories	Included	Included	\$200.00
12 Channels, 8 Bands	Included	Included	\$200.00
Independent WDRC	Included	Included	\$200.00
Adaptive Directionality	Included	Included	\$250.00
Adaptive Noise Reduction	Included	Included	\$250.00
Adaptive Feedback Control	Included	Included	\$250.00
Professional Fee	Included	\$200.00	\$200.00
7-Year Mft Warranty	Included	Included	\$150.00
Total	\$2200.00	\$2200.00	\$2200.00

Amiani et al (2011)

ADVERTISEMENT SHOWN TO RESPONDENTS IN GROUP 1

- 100% Paper Signal Processing
- Bluetooth
- 100% User Satisfaction

ADVERTISEMENT SHOWN TO RESPONDENTS IN GROUP 2

- 100% Paper Signal Processing
- Bluetooth
- 100% User Satisfaction
- Advanced Signal Processing
- Advanced Noise Reduction
- Advanced Feedback Control
- Advanced Call
- Advanced Microphone

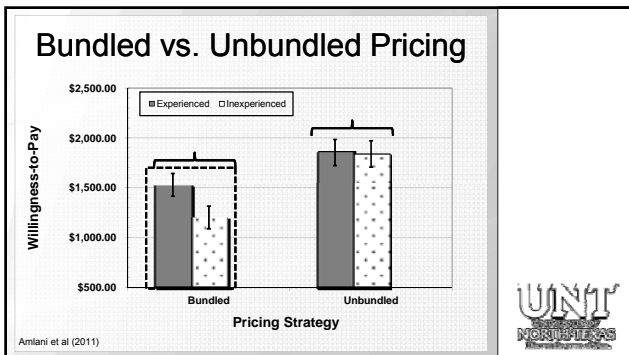
ADVERTISEMENT SHOWN TO RESPONDENTS IN GROUP 3

- 100% Paper Signal Processing
- 100% User Satisfaction
- Advanced Signal Processing
- Advanced Noise Reduction
- Advanced Feedback Control
- Advanced Call
- Advanced Microphone
- Advanced Battery

Amlani et al (2011)

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Myth 5: Unbundling Prices will Decrease Adoption Rates

- Unbundling pricing strategy
 - Is favored by current and potential users over a bundled pricing strategy
 - Reduces the dichotomy between current users—who favor technology—and potential users—who favor rehabilitation

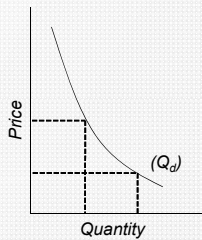


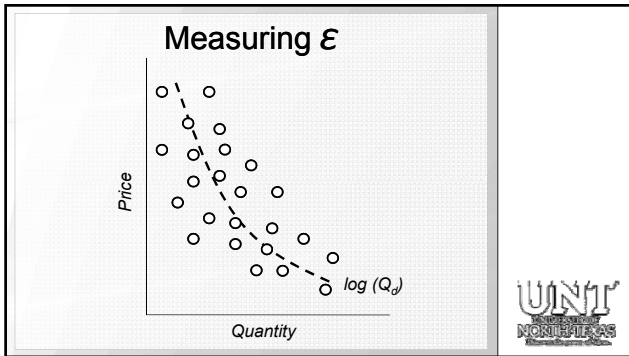
Myth 6: Hearing Aid Market Has an Elastic Demand

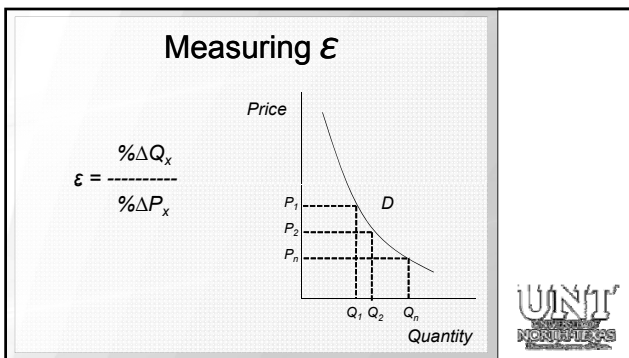


Price Elasticity of Demand

- Price elasticity of demand (ϵ) measures the sensitivity of consumer purchasing behavior between price and quantity demanded
 - Price and quantity are inversely related







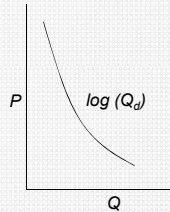
Interpreting Price Elasticity of Demand

- Elastic ($\epsilon > |1|$)
 - Consumers are responsive (sensitive) to changes in price
 - As price increases, quantity demanded decreases
 - As price decreases, quantity demanded increases
- Inelastic ($\epsilon < |1|$)
 - Consumers are not as responsive (sensitive) to changes in price
 - As price increases, quantity demanded decreases only slightly
 - As price decreases, quantity demanded increases only slightly

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Elasticity and Hearing Aid Market

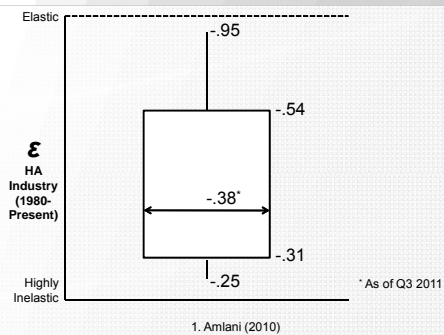
- Demand function within the hearing aid market is inelastic (Aaron, 1987; Lee & Lotz, 1998; Amlani & De Silva, 2005; Amlani, 2010)
 - ϵ ranges between -0.31 and -0.54
 - $\epsilon = -0.38$ as of Q3 2011



Application of Findings

- Amlani (Unpublished, November 2011)
 - $\epsilon = -.38$
 - As market demand increases by 3.8%, price decreases by 10%
 - 100% price reduction = 38% increase in demand
 - Present day conventional adoption rate of 24.60% would increase to 33.95%





Price Elasticity and Estimated "Conventional" Adoption Rate

Est. Current Users (mil) - 2012	ϵ	Subsidized (%)	Est. Increase in New Users (mil)	Est. Users (mil)	Est. Non Users (mil)
8.45 ²	-.25 ¹	100	2.11	10.57	23.79
8.45 ²	-.38 ²	100	3.21	11.66	22.70
8.45 ²	-.95 ¹	100	8.03	16.48	17.88

1. Amlani (2010); 2. Amlani (November 2011, Unpublished)

Myth 6: Hearing Aid Market Has an Elastic Demand

- The HA market's demand is inelastic
 - Consumers are not sensitive to changes in price
 - Therefore, lowering the price of devices will not increase adoption rates markedly
- The amount of market growth is dependent on the elasticity of the demand function
 - Making the inelastic demand more elastic



Myth 7: Reducing the Price of Hearing Aids will Increase Total Revenue in a Market having an Inelastic Demand

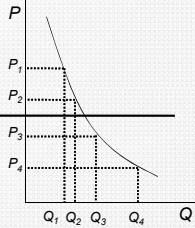


Elasticity and Hearing Aid Market

- At high prices, demand function is elastic¹

\$1623²

- At low prices, demand function is inelastic¹



1. Amlani & De Silva (2005); 2. Amlani (2010)



Relationship – ϵ and Total Revenue

$$\text{Total Revenue} = \sum (\text{Price}_i \times \text{Quantity}_i)$$

Demand	Raise Prices	Reduce Prices
Elastic	Total Revenue Decreases	Total Revenue Increases
Inelastic	Total Revenue Increases	Total Revenue Decreases

Amlani (2008)

Caveat: Over-charging is not being advocated. Over-charging for a product or service can result in no gain or a loss in revenue.



Hypothetical Data – ABC Audiology, LLC
Data from Fiscal Year 2010-2011

Q	% ΔQ	P	% ΔP	ϵ	R
20		\$ 1,000.00			\$ 20,000.00
17	-0.16	\$ 1,700.00	0.52	-0.31	\$ 28,900.00
14	-0.19	\$ 2,500.00	0.38	-0.51	\$ 35,000.00
11	-0.24	\$ 3,300.00	0.28	-0.87	\$ 36,300.00
8	-0.32	\$ 4,000.00	0.19	-1.65	\$ 32,000.00
5	-0.46	\$ 4,800.00	0.18	-2.54	\$ 24,000.00
75					\$ 176,200.00

Forecast Scenario #1 – ABC Audiology, LLC Reducing Price (-\$200) Across the Board					
Q	%ΔQ	P	%ΔP	ε	R
21 (+1)		\$ 800.00			\$ 16,800.00
18 (+1)	-0.15	\$ 1,500.00	0.61	-0.25	\$ 27,000.00
15 (+1)	-0.18	\$ 2,300.00	0.42	-0.43	\$ 34,500.00
12 (+1)	-0.22	\$ 3,100.00	0.30	-0.75	\$ 37,200.00
9 (+1)	-0.29	\$ 3,800.00	0.20	-1.41	\$ 34,200.00
6 (+1)	-0.40	\$ 4,600.00	0.19	-2.10	\$ 27,600.00
81					\$ 177,300.00
					+\$1100.00

Forecast Scenario #2 – ABC Audiology, LLC Increasing Price (+\$200) Across the Board					
Q	%ΔQ	P	%ΔP	ε	R
19 (-1)		\$ 1,200.00			\$ 22,800.00
16 (-1)	-0.17	\$ 1,900.00	0.45	-0.38	\$ 30,400.00
13 (-1)	-0.21	\$ 2,700.00	0.35	-0.59	\$ 35,100.00
11 (-1)	-0.26	\$ 3,500.00	0.26	-1.01	\$ 35,000.00
7 (-1)	-0.35	\$ 4,200.00	0.18	-1.94	\$ 29,400.00
4 (-1)	-0.55	\$ 5,000.00	0.17	-3.14	\$ 20,000.00
69					\$ 172,700.00
					-\$3500.00

Forecast Scenario #3 – ABC Audiology, LLC Following Revenue Table					
Q	%ΔQ	P	%ΔP	ε	R
19 (-1)		\$ 1,200.00♦			\$ 22,800.00
16 (-1)	-0.17	\$ 1,900.00♦	0.45	-0.38	\$ 30,400.00
13 (-1)	-0.21	\$ 2,700.00♦	0.35	-0.59	\$ 35,100.00
10 (-1)	-0.25	\$ 3,500.00♦	0.26	-0.97	\$ 35,000.00
9 (+1)	-0.11	\$ 3,800.00♦	0.08	-1.28	\$ 34,200.00
6 (+1)	-0.40	\$ 4,600.00♦	0.19	-2.10	\$ 27,600.00
73					\$ 185,100.00
♦ = Increase Price (+\$200) ♦ = Decrease Price (-\$200)					+\$8900.00

Myth 7: Reducing the Price of Hearing Aids will Increase Total Revenue for an Inelastic Demand

- Understanding the impact of elasticity on total revenue can improve the **bottom line**
 - Increase prices when demand function is inelastic
 - Decrease prices when demand is elastic
 - Blind adjustments will reduce potential revenue-earning opportunities




Myth 8: Federal Subsidies will Increase Adoption Rates



Proposed Bill	Tax Credit	Availability	Qualified Recipients	Income Cap
HR 1646	\$500 per qualified hearing aid; maximum credit of \$1000	Once every 5 years	Individuals \leq 18 years of age and individuals \geq 55 years of age	Adjusted gross income $>$ \$200,000
S 1019	\$500 per qualified hearing aid; maximum credit of \$1000	Once every 5 years	Individuals of all ages	None

Amlani (2010)



HA Tax Credit and Estimated Users US¹

Est. Current Users (mil)	ε	Subsidized (%)	Est. Increase in New Users (mil)	Est. Users (mil)	Est. Non Users (mil)
8.45*	-.31	25	0.66	9.11	25.25
8.45*	-.38	25	0.80	9.26	25.10
8.45*	-.54	25	1.14	9.59	24.77
8.45*	-.31	25	0.66	9.11	7.37
8.45*	-.38	25	0.80	9.26	7.22
8.45*	-.54	25	1.14	9.59	6.89

Key: * = conventional estimate; † = practical estimate
Amlani (November 2011, Unpublished)

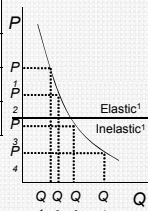
HA Tax Credit Limitations

- Assumes that end user is willing to purchase devices retailing at an average cost of \$2000 each at the time services are rendered
 - MarkeTrak VII revealed that financial considerations precluded three in 10 respondents from obtaining hearing aids (Kochkin, 2007)
 - If true today, the estimates presented will be reduced by 30%



Pricing Structure and Tax Credit

Monaural HA Price	Savings	Discount
\$ 1,000.00	\$ 500.00	50%
\$ 2,000.00	\$ 500.00	25%
\$ 3,000.00	\$ 500.00	17%



Demand	Raise Prices	Reduce Prices
Elastic	Total Revenue Decreases	Total Revenue Increases
Inelastic	Total Revenue Increases	Total Revenue Decreases

Amlani (2008)

1. Amlani & De Silva (2005)



Low-Price Hearing Aids and Satisfaction

- Lower satisfaction ratings for low-end hearing aids compared to high-end devices, because the former have been known not to meet the listening needs of the user (Callaway & Punch, 2008; Ramachandran et al, 2011)



Myth 8: Federal Subsidies will Increase Adoption Rates

- Fully subsidized hearing aids will grow the market over the present-day capitalistic model, but only slightly
- Tax Credit *will* improve market penetration, but to not to the degree reported by agencies and personnel with ties to industry



Myth 9: Over-the-Counter and Internet Sold Devices will Reduce Adoption Rates



Improving ϵ

- Leading factor - Increase availability of substitutes
 - The greater the number of substitute products, the greater the elasticity
 - Hearing aid market has few substitutes (e.g., middle ear Implants, bone conduction)
- Education
 - Hearing aids viewed as a **necessity** will increase quantity demanded
 - Counseling and rehabilitation



Improving ϵ

- Uniqueness (www.loginhear.com)
 - Provide potential user with comparison chart of features/options across manufacturers and models
 - Most wearers are unaware of the technology (Amlani et al, 2011)
- Reduce out-of-pocket expenses
 - Improve insurance co-pay (i.e., improve benefits)
 - Third-party financing
- Switching costs
 - Ability to use existing equipment with device
 - Cell phone, FM system, MP3



Myth 9: OTC Aids will Reduce Adoption Rates

- Increasing the number of substitutes is the primary means by which to attract new users
- In the case of increasing substitutes in the hearing aid market, potential users need to be educated on the expectations of OTC devices, as well as the need for audiological services
 - Counseling and rehabilitation





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