



TFI Wireless Forecast

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**TFI Communications Technology
Asset Valuation Conference**

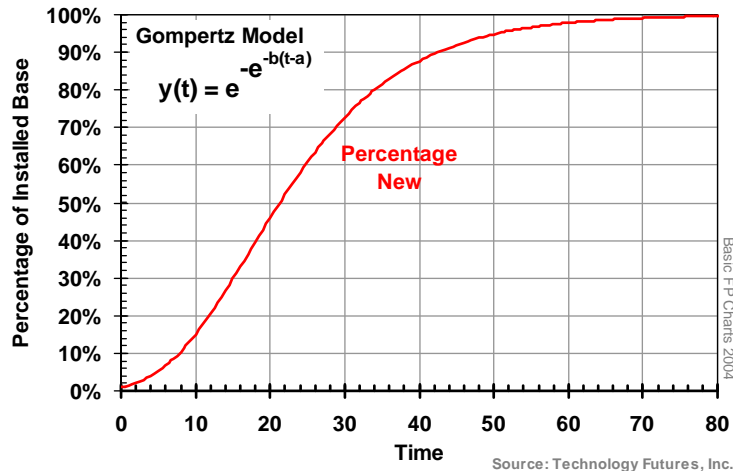
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Radisson Downtown
Austin, Texas

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The Gompertz Model



$y(t)$ = Fraction of market taken over by new technology at time "t"
"a" is 37% time; "b" determines rate of substitution

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Wireless Universe?

- Wireline – Places
- Wireless Voice – People
- Wireless Data – Devices
- Wireless Potential – All things fixed or mobile, man or machine (Now referred to as the Internet of Things)
- We now forecast connections rather than subscribers

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The Internet of Things has the Potential of Becoming Much Larger

- As an example of the potential, one forecast calls for the Internet of Things to grow to 26 billion units by 2020 compared to smartphones, tablets, and PCs reaching only about 7.3 billion units at that time.

Source: CTIA - Facts and Infographics

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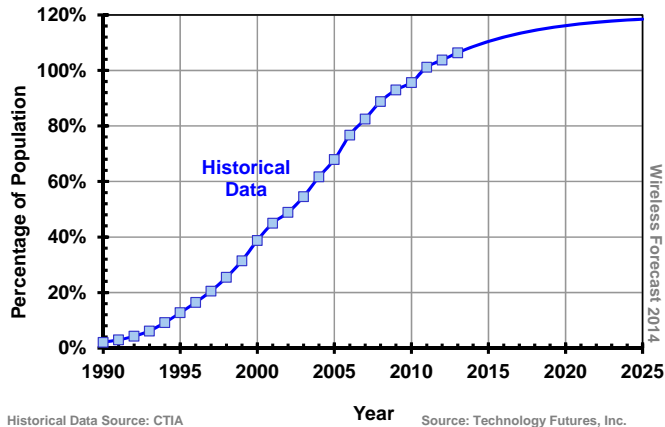
Bottom Line – The Market is Expanding

- Still room to grow
- Current TFI forecasting model is working very well. Most connection decisions still made by consumers (Consumer Adoption i.e. Gompertz)
- Drivers for future growth will be different as Machine to Machine becomes larger
- May require changes to the forecasting model or separate forecast for Machine to Machine

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2014 TFI Wireless Penetration Forecast



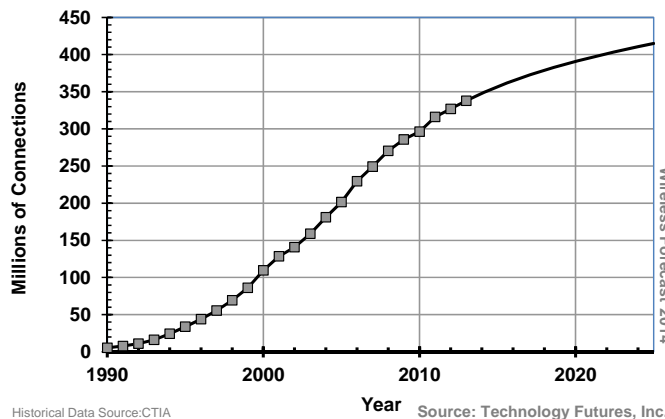
Historical Data Source: CTIA

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2014 TFI Wireless Connections Forecast



Historical Data Source:CTIA

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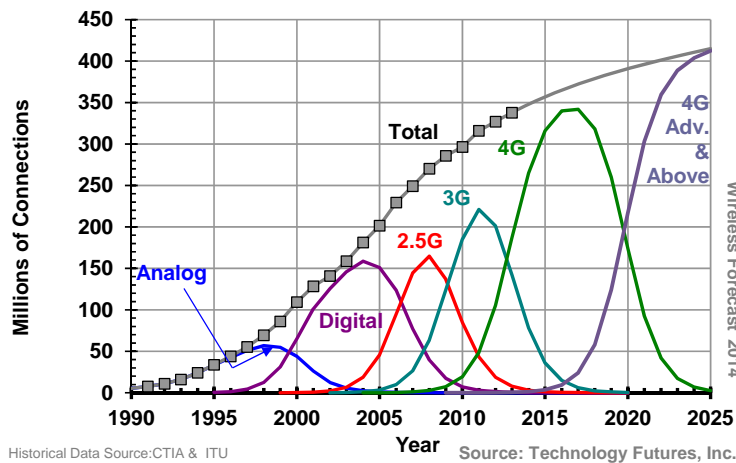
2014 TFI Wireless Penetration/Connections Forecast Tabulated

Year	Population (millions)	Penetration	Connections (millions)	
1990	250.8	2%	5.3	Historical
1991	253.6	3%	7.6	
1992	256.4	4%	11.0	
1993	259.1	6%	16.0	
1994	261.9	9%	24.1	
1995	264.7	13%	33.8	
1996	267.3	16%	44.0	
1997	269.0	21%	55.3	
1998	271.2	26%	69.2	
1999	273.4	31%	86.0	
2000	282.2	39%	109.5	
2001	285.1	45%	128.4	
2002	288.0	49%	140.8	
2003	290.9	55%	158.7	
2004	293.7	62%	181.1	
2005	296.4	68%	201.4	
2006	299.1	77%	229.5	
2007	301.7	83%	249.1	
2008	304.4	89%	270.3	
2009	307.0	93%	285.6	
2010	309.7	96%	296.3	
2011	312.3	101%	316.0	
2012	315.0	104%	326.8	
2013	317.6	106%	337.9	
2014	320.3	109%	347.8	Forecast
2015	323.0	110%	356.7	
2016	325.7	112%	364.8	
2017	328.4	113%	372.1	
2018	331.1	114%	378.8	
2019	333.8	115%	385.0	
2020	336.5	116%	390.8	
2021	339.2	117%	396.1	
2022	341.9	117%	401.2	
2023	344.7	118%	405.9	
2024	347.5	118%	410.5	
2025	350.3	118%	414.9	

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2014 TFI Wireless Generations Forecast



Historical Data Source: CTIA & ITU

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2014 TFI Wireless Generations Forecast, Percentages (Tabular Data)

Year	Analog	Digital	G2.5	G3	G4	G4 Adv
Ending	T0	T1	T2	T3	T4	T5
1990	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%
1991	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%
1992	99.9%	0.1%	0.0%	0.0%	0.0%	0.0%
1993	99.8%	0.2%	0.0%	0.0%	0.0%	0.0%
1994	99.5%	0.5%	0.0%	0.0%	0.0%	0.0%
1995	98.8%	1.2%	0.0%	0.0%	0.0%	0.0%
1996	96.9%	3.1%	0.0%	0.0%	0.0%	0.0%
1997	92.3%	7.7%	0.0%	0.0%	0.0%	0.0%
1998	82.1%	17.9%	0.0%	0.0%	0.0%	0.0%
1999	63.7%	36.2%	0.1%	0.0%	0.0%	0.0%
2000	40.1%	59.6%	0.2%	0.0%	0.0%	0.0%
2001	20.4%	78.9%	0.6%	0.0%	0.0%	0.0%
2002	8.9%	89.3%	1.7%	0.1%	0.0%	0.0%
2003	3.8%	91.9%	4.2%	0.3%	0.0%	0.0%
2004	1.4%	87.6%	10.3%	0.7%	0.0%	0.0%
2005	0.5%	75.0%	22.7%	1.7%	0.1%	0.0%
2006	0.2%	53.9%	41.4%	4.4%	0.1%	0.0%
2007	0.1%	31.0%	58.0%	10.6%	0.4%	0.0%
2008	0.0%	14.6%	60.9%	23.5%	1.0%	0.0%
2009	0.0%	6.1%	48.0%	43.3%	2.6%	0.0%
2010	0.0%	2.4%	28.6%	62.5%	6.5%	0.0%
2011	0.0%	0.9%	13.7%	70.0%	15.4%	0.0%
2012	0.0%	0.4%	5.8%	61.6%	32.2%	0.1%
2013	0.0%	0.1%	2.3%	42.1%	55.3%	0.1%
2014	0.0%	0.1%	0.9%	22.5%	76.2%	0.4%
2015	0.0%	0.0%	0.3%	10.1%	88.5%	1.0%
2016	0.0%	0.0%	0.1%	4.1%	93.2%	2.6%
2017	0.0%	0.0%	0.1%	1.6%	91.8%	6.5%
2018	0.0%	0.0%	0.0%	0.6%	84.0%	15.4%
2019	0.0%	0.0%	0.0%	0.2%	67.5%	32.2%
2020	0.0%	0.0%	0.0%	0.1%	44.4%	55.5%
2020	0.0%	0.0%	0.0%	0.0%	23.4%	76.6%
2020	0.0%	0.0%	0.0%	0.0%	10.4%	89.5%
2020	0.0%	0.0%	0.0%	0.0%	4.3%	95.7%
2020	0.0%	0.0%	0.0%	0.0%	1.7%	98.3%
2020	0.0%	0.0%	0.0%	0.0%	0.6%	99.4%

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2014 TFI Wireless Generations Forecast, Connections (Tabular Data)

Year	UNITS (millions)						
	Total	Analog	Digital	G2.5	G3	G4	G4 Adv
	T0	T1	T2	T3	T4	T5	
1990	5.3	5.3					
1991	7.6	7.6					
1992	11.0	11.0					
1993	16.0	16.0					
1994	24.1	24.0					
1995	33.8	33.4	0.4				
1996	44.0	42.7	1.4				
1997	55.3	51.1	4.3				
1998	69.2	56.8	12.4				
1999	86.0	54.8	31.2	0.1			
2000	109.5	43.9	65.3	0.3			
2001	128.4	26.2	101.3	0.8			
2002	140.8	12.5	125.7	2.3	0.1		
2003	158.7	5.7	145.8	6.7	0.4		
2004	181.1	2.6	158.6	18.7	1.2	0.0	
2005	201.4	1.1	151.0	45.7	3.4	0.1	
2006	229.5	0.5	123.7	95.0	10.0	0.3	
2007	249.1	0.2	77.1	144.4	25.4	1.0	
2008	270.3	0.1	39.5	184.6	65.4	2.7	
2009	285.6	0.0	17.5	137.0	123.7	7.4	
2010	296.3	0.0	7.2	84.7	185.1	19.2	
2011	316.0	0.0	3.0	43.3	221.1	48.5	0.1
2012	326.8	0.0	1.2	18.9	201.3	105.2	0.2
2013	337.9	0.0	0.5	7.8	142.1	187.0	0.5
2014	347.8	0.0	0.2	3.1	78.2	264.9	1.3
2015	356.7	0.0	0.1	1.2	36.0	315.8	3.6
2016	364.8	0.0	0.0	0.5	15.1	339.8	9.4
2017	372.1	0.0	0.0	0.2	6.0	341.8	24.1
2018	378.8	0.0	0.0	0.1	2.4	318.2	58.2
2019	385.0	0.0	0.0	0.0	0.9	259.9	124.2
2020	390.8	0.0	0.0	0.0	0.4	173.5	216.9
2020	396.1	0.0	0.0	0.0	0.1	92.7	303.3
2020	401.2	0.0	0.0	0.0	0.1	41.9	359.2
2020	405.9	0.0	0.0	0.0	0.0	17.3	388.6
2020	410.5	0.0	0.0	0.0	0.0	6.9	403.7
2020	414.9	0.0	0.0	0.0	0.0	2.7	412.3

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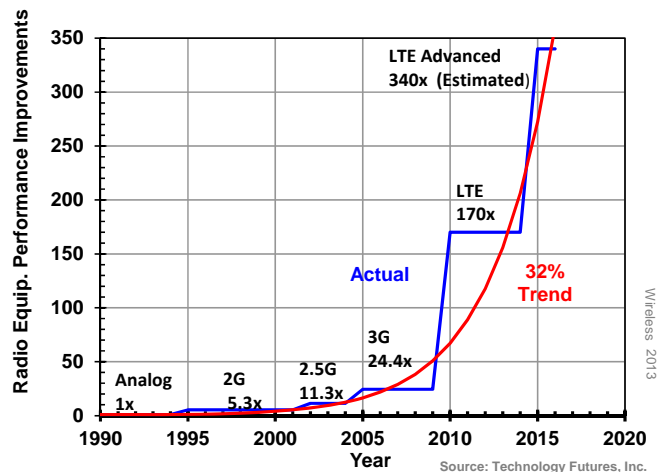
Two Key Drivers for New Generations

- Mobile data traffic is growing much more rapidly than connections
- Greatly improving cost/performance of newer technology

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Wireless Generations, Performance



Wireless 2013

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