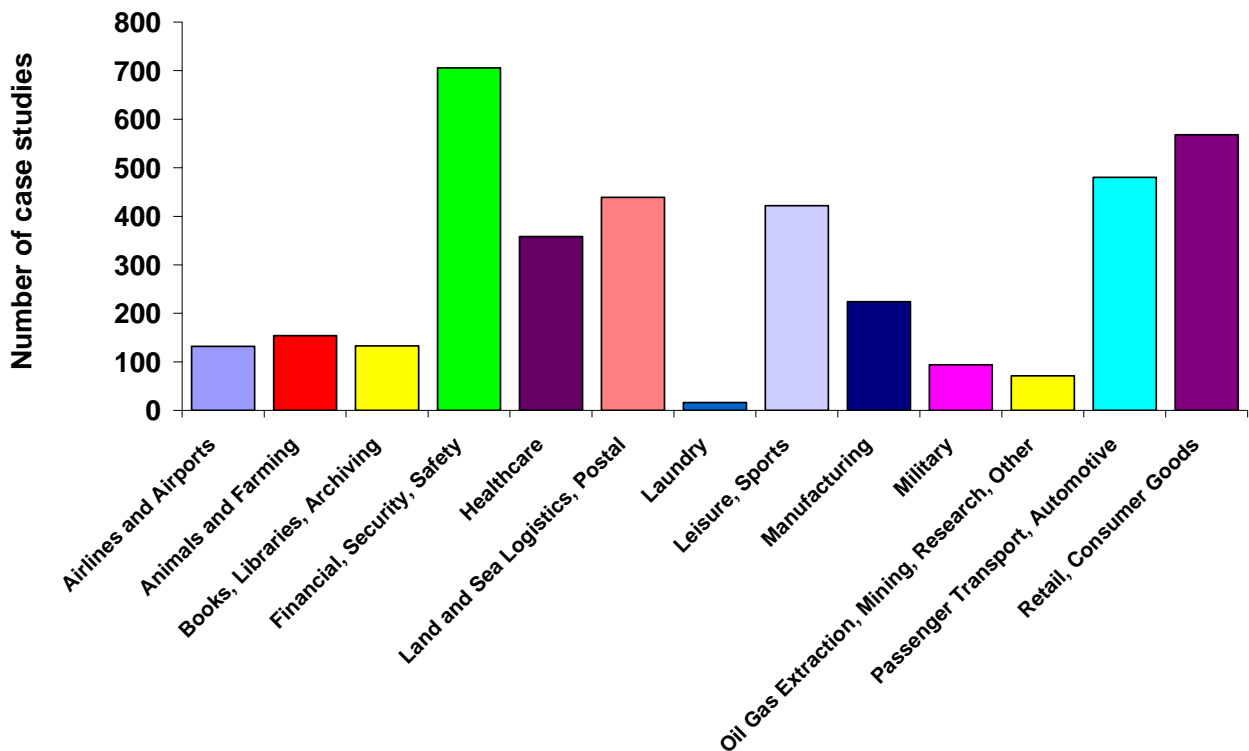


Figure 5 Number of case studies split by sector, from the IDTechEx RFID Knowledgebase



Source www.rfidbase.com

Tagging of people increases rapidly

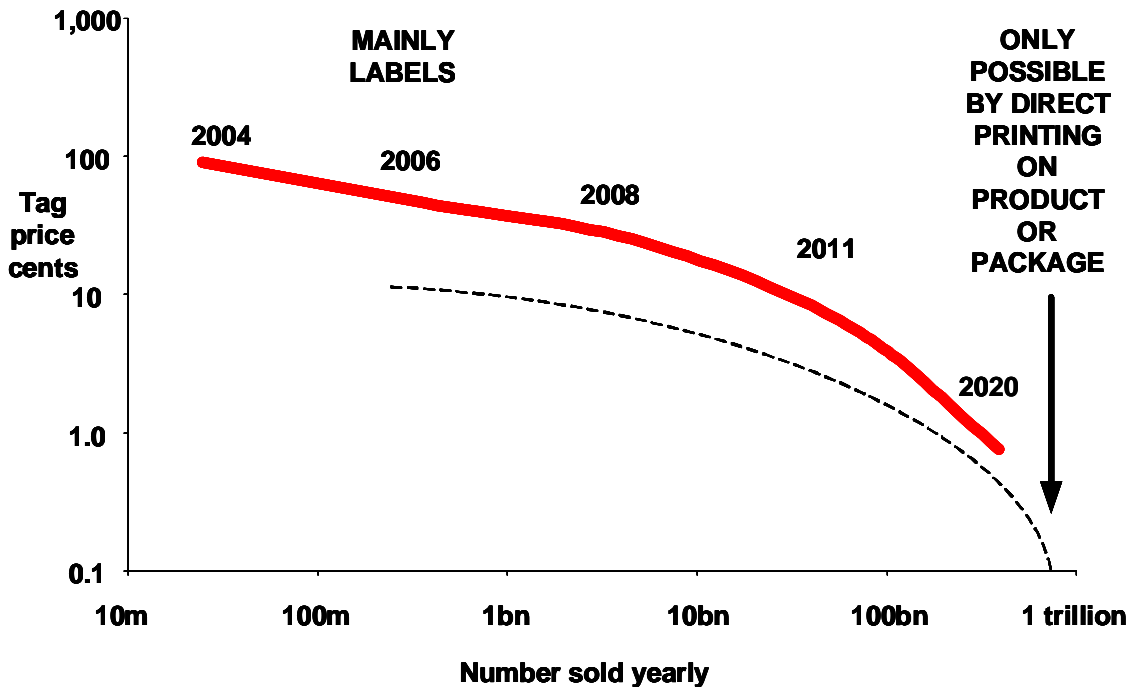
By the end of 2008, the RFID tagging of people had jumped from 11% to 24% of all projects cumulatively. It may not please the privacy advocates but it allowed nurses to radio their precise location when they were being assaulted, mother-baby mismatches and baby theft to be reduced, paedophiles to be controlled, prisoner escapes prevented and severe diabetics getting correct treatment before they died in the street. The disoriented elderly no longer needed a “jailer” because any dangerous wandering was detected electronically and children could be traced by their parents in theme parks. Should we be ashamed of that?

Active RFID comes to the fore

Definitions of active RFID become blurred as we now have WiFi, ZigBee, DSRC, Bluetooth, RuBee and other short range communication devices acting primarily as identification devices, mostly creating new markets such as Real Time Locating Systems (RTLS) (see the IDTechEx report at www.IDTechEx.com/rtls) and sensing networks. Active RFID (including RTLS) alone is creating a market which will be worth \$6.74 billion in 2019 within our overall figures.

The RTLS (Real Time Locating Systems) and Military schemes involved active tags of course. Let us look more closely at active RFID because all is not what it seems to be. Active RFID accounted for about 10% of all RFID expenditure in 2008, but this figure was depressed by the huge Chinese national ID card scheme, which involves passive RFID. Look at the IDTechEx Knowledgebase and you see a more meaningful picture for the future, given that the Chinese ID card scheme has now

Fig. 1.4 The adoption curve 2004-2020



Source IDTechEx

The price volume sensitivity for RFID in the form of high volume labels is lower than the all-embracing curve shown above. This is because labels address the more price-sensitive markets in the main, these being those with potentially the highest volumes. However, the price volume curve for high volume RFID labels should be no lower than for anti-theft EAS labels for reasons we shall give below.

Price sensitivity for high volume label production

To establish the price sensitivity for RFID label production, we must exclude systems where the tag cost is the minor part of cost of ownership of the RFID system. In such cases, the tag cost has only a second order effect on sales. That leaves most of the high volume applications. Secondly, we must recognize that there will be a spread of possible outcomes. Even up to very high volumes, organizations will be fitting RFID for very different reasons - often ones that are difficult or impossible to quantify. For instance, Philip Morris and the China National Tobacco Monopoly together ship 63 billion packets of cigarettes yearly and dearly want RFID, primarily for anti-counterfeiting. At what price? It depends how they do the calculation.

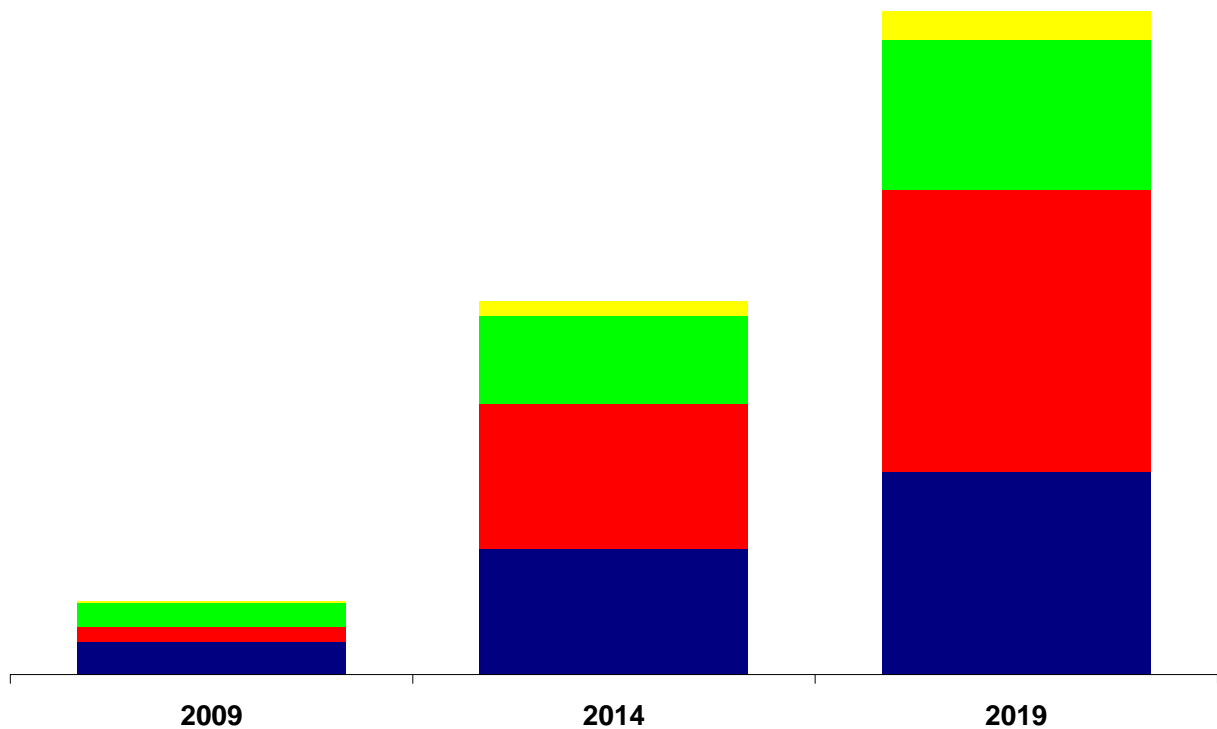
Another reason for a spread of price-volume curves lies in the fact that legislation, mandates and just pressure from organizations encourages adoption before the tipping point of price in certain applicational sectors. Excessive competition in certain sectors also distorts the situation.

3.4. Projected sales of RFID tags by territory

Table 3.5 gives our projected sales of RFID tags by territory.

Table 3.5 **Number of tags in billions by territory 2009, 2014, 2019**

Numbers of tags (billions)	2009	2014	2019
North America	X	X	X
East Asia	X	X	X
Europe	X	X	X
ROW	X	X	X
Total (billions)	X	X	X



Source IDTechEx

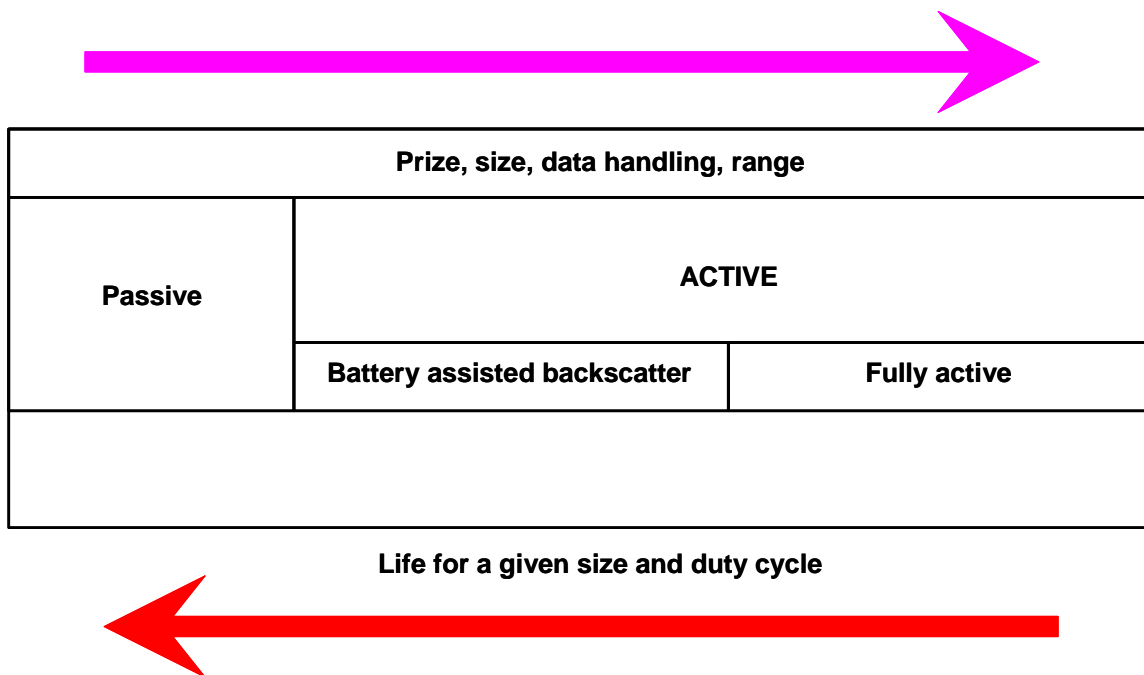
Value of systems including tags by territory 2009-2019

The value of systems/ service is slightly higher than that for tags in 2009. Traditional RFID applications have system/ service as the major cost, it being typically 70-80% of total cost. However, new applications of high volume are where the system/ service cost typically almost equals the tag cost. However, a distortion in the short to medium term is the fact that a great deal of infrastructure will need to go in ahead of the tags.

intervals. This data can be collected by reading the tag in the same way you read a passive tag. This is being trialled on blood, foods, flowers and many other products.

Active RFID tags incorporate a battery which is used to boost the return signal. Here, the tag acts as a transmitter and can either be activated by an incoming RF signal or transmit its identity at preset intervals. Because it only requires a weak signal to be detected as it does not rely on the incoming signal to modulate back (backscatter) its information, ranges are much longer compared to those of passive systems. Ranges of hundreds of meters can be achieved, but this falls dramatically in "busy" environments where objects create interference reducing the range. One subset of Active RFID is Real Time Locating Systems, which monitors either the received signal strength from the tag at each reader and/or the time of arrival of the signal from the tag at each reader to triangulate the position of the tag in real time. Until 2006 the majority of active RFID systems were proprietary. Now, active RFID systems exist which can work over other standards such as Wi-Fi (meaning new infrastructure is not always required) and other interfaces such as ZigBee, Bluetooth and Ultra Wide Band (UWB).

Fig. 5.1 **Passive RFID compared with the various types of active RFID**



Source IDTechEx

Fig. 5.3 Printed batteries from Infinite Power Solutions and the concept by the Smart Active Labels Consortium of using RFID smart labels with similar batteries to boost range in warehouse environments.



Source Infinite Power Solutions and SAL

5.7.3. An example of massive ‘niches’

The prison / correctional facility and parole service opportunity

The prisons of the world – what the Americans call correctional facilities - and the control of prisoners released on parole offer many potential markets for RFID. New technology is not essential here but there may be improvements if the newly available Ultra Wide Band and/or systems combining WiFi, GPS and so on are used as they become more sensitive and more economical. Table 5.5 gives a summary of applications.

Market potential

We do not assume that the tens of thousands of prisons in the Third World will adopt this technology any time soon and it is not in the highest volume category as it probably only has potential for rising to of the order of one million tags a year in the 2007 to 2017 timeframe at several dollars each. Nevertheless, it is an example of a relatively new market with scope for up to one billion dollars yearly in total sales globally of RFID hardware, software and services within a few years. This is because the tags can cost tens of dollars and the system is sophisticated.