

# PAX Technical Appendix

## INTRODUCTION

The Pan Asia-Pacific Cross Media Survey (PAX) started in 1997 and provides continuous, quarterly tracking of elite audiences. The primary objective of the survey is as the currency to track media, prosperity and influence across the target markets covered in the study. PAX typically covers similar audiences to those in EMS, the sister survey in Europe, Africa and the Middle East.

The survey is constantly evolving to meet the needs of regional media, media specialists and advertisers who depend on the results to place advertising. It provides accurate measurement of television viewership, print readership and major web site audiences, both regional and local, in every market. PAX also covers a wide range of demographic information, consumption behaviour and business activities of the elite audiences in the region.

PAX focuses on three principal audiences age 25-64 which are of prime interest to advertisers of quality products and services, and suppliers to businesses:

- **Affluent Adults:** people who live in a household which enjoys a household income well above the average for that city. This group, the largest in the survey, has substantial disposable income available to spend. It is projected that there are over 10 million Affluent Adults, excluding those who are also BDM's (see below), in the markets covered by PAX.
- **Business Decision Makers (BDM's):** executives, management and knowledge workers aged 25-64 in charge of a department or function, working full time in companies with 10 or more staff who earn a personal income significantly above the average for that city. This group of close to 4 million individuals has substantial disposable personal income available, and also is of key interest to B2B marketers.
- **Top Management BDM's:** the most senior group of BDM's, who are often the final decision makers in their organisation. As a group, they wield significant purchasing power and influence at work, whilst having the highest personal income. There are over 800,000 Top Management covered in PAX.

## **PAX SAMPLE EXPANSION AND ENHANCEMENTS**

### Market expansion

PAX was first conducted in 1997 across 7 Asian markets, expanding to India in 1999 and Korea in 2000. Two further countries were included in 2002, being Australia and Japan - bringing the total coverage to 11 countries. Melbourne has been included in the fieldwork since Q4 2004 - bringing the total coverage to 11 countries and 14 cities.

### Continuous tracking

Commencing from July 2002, PAX made a major change in fieldwork and reporting. The survey now runs continuously with monthly balanced samples and quarterly updates. The shift in reporting brings several benefits. First, the impact of significant events on media behaviour can be identified alongside other changes in audiences. Second, shifts in consumer and business behaviour become apparent and can be capitalised on in a timely manner.

### Sample sizes

The annual sample size of India across 3 cities stands at 3,000 since July 2004. Sydney and Melbourne are covered in Australia with a total annual sample of 2,200. More than 20,000 in-depth random and booster interviews with individuals at the top of society are conducted under rigorous quality controls every year.

## UNIQUE BENEFITS OF PAX

PAX brings a number of unique advantages, and is the currency for upscale media audiences across the Asia Pacific region. The main benefits are:

1. PAX reflects the current marketplace picture, reflecting changes in media audiences, economies, consumer and business behaviour.
2. The widest geographic coverage, using harmonised questions for ease of interpretation and application across countries for advertising decision making.
3. Complete coverage of upscale target consumers and their media consumption. PAX is the only survey which does not exclude key consumer or media categories.
4. Continuous tracking with quarterly updates quickly identifies market trends and changes in media.
5. Cross-media campaign planning allows reach and frequency and other metrics to be calculated. The most valuable combinations of media can then be selected, across local and regional TV and print.
6. The largest sample sizes for upscale audiences allow in-depth analyses not possible from any other survey source.
7. CATI, computer-assisted telephone interviews, provide the best method to define upscale audience size and composition. Up to 20 calls are made to contact the most elusive and important members of society.
8. Wide adoption by regional broadcasters and publishers, all leading media specialists and major clients. PAX is the common currency used to select and buy advertising in regional, or combined regional and local advertising campaigns.
9. Ability to compare audiences and trends across Asia Pacific, Europe and the Middle East because the Synovate PAX and EMS surveys are closely aligned in terms of target audiences and questionnaire contents.

## COUNTRIES, CITIES AND SAMPLE SIZES IN PAX

PAX typically covers capital cities, which are usually also the commercial capitals. In India, 3 cities are covered so as to reflect some of the diversity of this large country of over 1 billion people. In Australia, Sydney and Melbourne are selected as the fieldwork markets.

As an example, **20,294 interviews** were completed for the 2009/ 2010 round, which commenced on June 15th 2009 and ended on June 13th 2010. Fieldwork was structured to achieve a composite day balance over the period of each month, to ensure that responses reflected true media exposure across each day of the week.

Details of sample sizes achieved for PAX Q1 2009 – Q4 2009 are set out below.

Country	City/ cities	Annual samples		
		Random	Booster	Total
Australia				
	Sydney	798	280	1,078
	Melbourne	799	291	1,090
Hong Kong	Hong Kong	1,234	443	1,677
India				
	Bangalore	467	299	766
	New Delhi	783	389	1,172
	Mumbai	761	371	1,132
Indonesia	Jakarta	1,314	503	1,817
Japan	Tokyo	1,020	404	1,424
Korea	Seoul	1,226	497	1,723
Malaysia	Kuala Lumpur	1,268	468	1,736
Philippines	Manila	1,205	472	1,677
Singapore	Singapore	1,253	481	1,734
Taiwan	Taipei	1,206	449	1,655
Thailand	Bangkok	1,217	542	1,759
<b>TOTAL</b>		14,551	5,889	20,440

All interviews are conducted via CATI. Random phone numbers are drawn from the telephone directory of that city, and 1 is added to the last digit of half of the phone numbers to ensure that ex-directory numbers are also captured. .

Apart from 3 countries (Australia, India and Japan), the random sample is typically around 1,200 per year for each country.

The only exception to the above approach is the collection of boosters of Top Management respondents. Whilst some sample of Top Management is collected via the random sample, an additional sample is drawn using company directories and lists as the basis of recruitment. The additional booster sample is typically 500 per city.

The data is compiled to provide quarterly updates of the results, each with one quarter of the annual sample size. Typically, one quarter of data per city is based on a sample of 425.

## ELIGIBILITY CRITERIA BY COUNTRY

All respondents must be aged 25 to 64. Beyond this basic definition, there are separate eligibility criteria for the three main groups within PAX. It should be noted that whilst Affluent Adults must live in an Affluent Household (with a household income above a specified minimum threshold), a BDM need not necessarily live in an Affluent Household (although the majority do). Therefore, the individual universes of Affluent Adults and BDM's do not add up to the total PAX universe. See the worked example at the end of this section.

### Affluent Adults

To be eligible for interview, the respondent must be living in a household with a minimum monthly income (unless otherwise specified) of:

Australia	A\$ 80,000 ( <i>per annum</i> )
Hong Kong	HK\$ 40,000
India	Rupee 30,000
Indonesia	Rupiah 7,500,000
Japan	Yen 9,000,000 ( <i>per annum</i> )
Korea	Won 4,500,000
Malaysia	Ringgit 6,500
Philippines	Pesos 70,000
Singapore	S\$ 6,500
Taiwan	NT\$ 140,000
Thailand	Baht 70,000

### Business Decision Makers (BDM's)

To be eligible for interview, the respondent must earn a personal minimum monthly income (unless otherwise specified) and also fulfill other occupational criteria as below:

Australia	A\$ 55,000 ( <i>per annum</i> )
Hong Kong	HK\$ 20,000
India	Rupee 20,000
Indonesia	Rupiah 5,000,000
Japan	Yen 5,500,000 ( <i>per annum</i> )
Korea	Won 2,500,000
Malaysia	Ringgit 5,000
Philippines	Pesos 35,000
Singapore	S\$ 3,500
Taiwan	NT\$ 75,000
Thailand	Baht 40,000

### Business People

- Age 25-64
- Work in company employing at least 10 people
- White collar management or supervisory position
- Department or section head

## Education

- University principal/Dean/Professor/Vice Professor/Head of Faculty
- Head master/Head mistress of secondary school or college

## Government

- Senior level, specified civil service grades or ranks

## Top Management

Note that Top Managers are a sub-group within the overall BDM category. There are also a few Affluent Adults who are *not* BDM's, because they work in a company with fewer than 10 staff. They may have senior titles, but do not meet the Top Management definition. To be eligible as a Top Manager, in addition to being a BDM, the respondent must have one of the following senior titles or its close equivalent.

- CEO
- CFO/Company Secretary
- MD
- President
- Vice President
- Director

## Example of universe composition

Take the PAX Q3 2009-Q2 2010 sample for Singapore as an example (all numbers shown are unweighted numbers). The sample composition can be broken down into the following categories:

- Total Sample: 1,709
- All Affluent Adults: 1,629
- Affluent Adults only: 875 (respondents who are Affluent Adults but not BDM)
- All BDM: 834
- BDM only: 80 (respondents who are BDM but not Affluent Adults)
- All Top Management: 544
- Both (i.e. Affluent Adults and BDM): 754

The samples will add up to the total by summing Affluent Adults only (875), BDM only (80) and Both (754) to derive a total sample of 1,709.

The same approach can be taken with weighted numbers.

## METHODOLOGY

### CATI interview technique

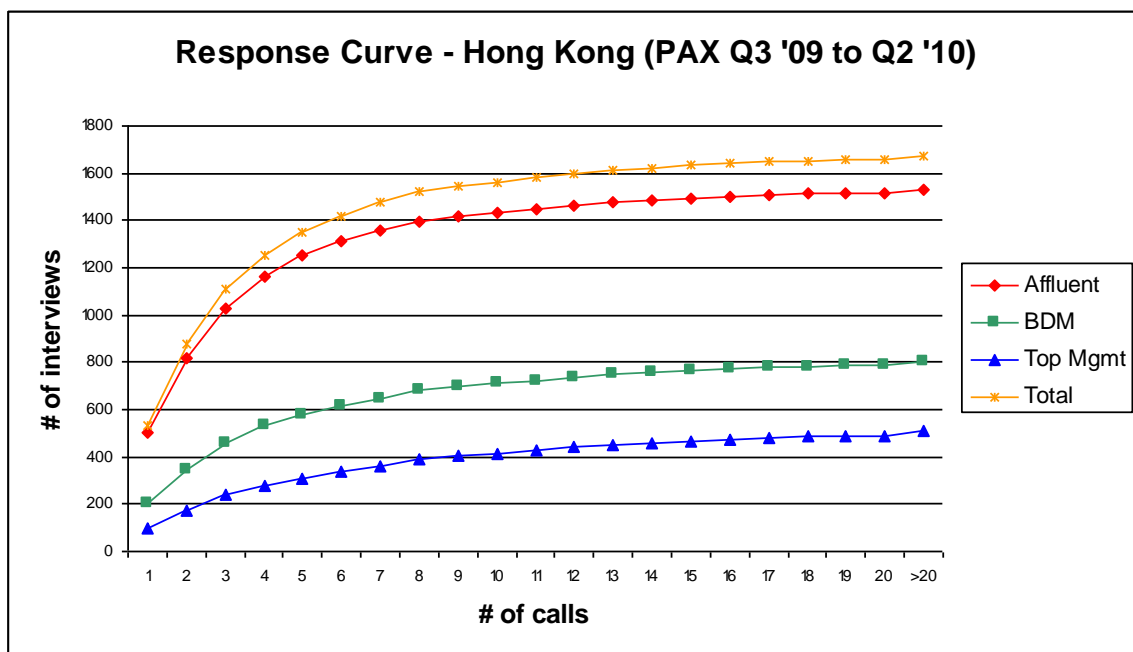
The PAX survey has been conducted over all the rounds of fieldwork to date using CATI (Computer Assisted Telephone Interviews). This is the most effective approach to secure maximum response rates whilst completing the interview in the shortest possible time. CATI allows automation to be included such as logic checking, skip patterns and multiple rotations of the media questions. The latter is of importance to ensure that each media title or channel is given an equal chance to be prompted through the survey sequence, eliminating any risk of order bias in the responses.

### Response rates

High response rates are the foundation of a high-quality survey, particularly a media currency amongst upscale targets. The higher the response, the greater the assurance that the results are both accurate and representative. A total of up to 20 calls are made to every selected phone number to ensure the maximum response to the PAX survey. The response rate across all 14 cities surveyed, in the period Q3 2009 to Q2 2010, was 34%.

Only CATI can achieve response rates as high as these amongst the target group because other techniques either do not offer the chance to maximise response; or (in the case of face-to-face interviews) are prohibitively expensive.

An example of how responses build as repeat calls are made to each selected number is shown below. The data used illustrates the principle of how responses increase as further calls are made, using information from the PAX Q3 2009-Q2 2010 survey for Hong Kong.



### Weighting and incidence of PAX eligibles

Because of the random nature of the sample selection, the database derived from the random interviews requires only simple grossing up to the total 25 to 64 year old resident population of each city to produce universe estimates. The only exception was for Top Management booster interviews, which were grossed up in combination with the Top Management responses derived from the random sample.

The weighting factors for projecting universe estimates are calculated using the household screening questions at the start of the random interview questionnaire. The screening questions yield incidence and composition data.

For example, in the following table of Q1 2007-Q4 2007 results, the screening interview in the Bangkok survey indicated that 20.7% of the population aged 25 to 64 years could be classified as Affluent Adults. Therefore, taking 20.7% of this age group in Bangkok yielded 973,000 Affluent Adults. The same logic could be applied to BDM's in Bangkok, which made up 4.4% of all residents aged 25 to 64 years - allowing us to project a figure of 208,000 BDM's for the city.

	Affluent Households	Affluent Adults	Affluent Adults Universe	BDM Individual	BDM Individual Universe	Total PAX Respondents	Merged Universe
Out of 25-64 Population							
Total 10 mkts	13.0%	16.1%	8,950,000	4.2%	2,311,000	17.2%	9,554,000
Total 11 mkts	14.2%	19.8%	13,300,000	5.8%	3,881,000	21.4%	14,356,000
Bangkok	20.3%	20.7%	973,000	4.4%	208,000	21.9%	1,028,000
HK	22.3%	28.9%	1,201,000	6.6%	273,000	30.6%	1,274,000
Jakarta	5.3%	6.9%	382,000	1.7%	96,000	7.1%	395,000
KL	17.9%	22.7%	404,000	5.7%	102,000	23.2%	414,000
Manila	7.3%	7.6%	406,000	1.4%	77,000	8.2%	434,000
Singapore	19.2%	25.5%	543,000	9.4%	200,000	28.6%	609,000
Taipei	18.6%	29.7%	1,137,000	6.0%	231,000	31.1%	1,190,000
Total India	6.0%	7.0%	1,250,000	2.5%	456,000	7.9%	1,418,000
Seoul	17.5%	23.0%	1,365,000	5.1%	302,000	24.1%	1,433,000
Sydney	27.6%	32.7%	768,000	9.2%	216,000	34.9%	818,000
Melbourne	24.6%	27.6%	521,000	7.9%	150,000	28.6%	541,000
Tokyo	19.7%	37.6%	4,350,000	13.6%	1,570,000	41.5%	4,802,000

### Exponential weighting

Reporting for PAX has shifted to a quarterly basis, commencing from the sample base collected during July to September 2002. Because the quarterly sample size is smaller than a full annual sample, the sampling variation (inherent in a reduced reporting base) increases. In order to reduce fluctuations due to normal sample collection and data variations within the sampling limits, exponential weighting was introduced. The benefit of such a weighting approach is that it reduces random quarter-on-quarter variations, whilst allowing real seasonal changes to manifest themselves. It can also be seen as adding to the sample size of the survey because it draws on the samples from 3 previous rounds of PAX.

Exponential weighting takes 12.5% of the value of the latest quarter of the survey, 18.8% of the value of the previous quarter, 21.9% of the next earlier quarter, 23.4% of the quarter before that, 11.7% of the next quarter before, and continues to decrease in weightage for the quarters beyond. The effect is to smooth random shifts in the results, allowing underlying dynamics to show through more clearly.

### Household income weighting

Weighting for the household income for the PAX survey has been implemented since Q3 2004. A differential non-response which tends to collect more responses from those at lower income levels and fewer responses from those at higher income levels is observed in the data. The introduction of this weight can correct the bias of the non-response in some degree and make the PAX figures more closely represent the population it surveys.

### Fusion

Data fusion was introduced in Q2 2003 to allow the capture of more in-depth information without having to increase the average interview length. It was done to limited components of the database, without affecting international media. The approach involves a random, representative equal split of interviews - the following indicates how various sections of the questionnaire are applied:

- Screener: asked of all respondents
- Regional media: asked of all respondents
- Local TV: asked of half of the respondents
- Local print: asked of half of the respondents
- Products and services: asked of half of the respondents
- Psychographics: asked of half of the respondents
- Demographics and business behavior: asked of all respondents

### Fieldwork and reporting timings

From Q2 2003 onwards, PAX data for each round has been reported on the basis of rolling four quarters of data. Data for current and previous quarters are processed together to produce a single moving annual report.

### Fieldwork administration

Prior to the commencement of fieldwork, the PAX project management team had visited each country to hold a training and briefing session with the local country operations staff responsible for conducting the interviews.

Typically, a two-day session would cover the following aspects:

1. Overview and objectives of the survey
2. Day and week sample balances and controls
3. Questionnaire contents and CATI programme operations
4. Interviewer briefing:
  - a. Training with CATI programme
  - b. Pilot interviews with local respondents for random and booster
5. Supervision and QC
6. Fieldwork progress monitoring and reporting
7. Interviewer retention and rewards

To ensure correct enunciation of English language title and channel names in PAX interviews, each interviewer must practise and speak each name to the satisfaction of the local project supervisor.

Whilst the majority of interviews in each country are conducted in the local native language, the choice of language in which the interview is conducted is at the request of the respondent. Each country is able to source interviewers who can speak other languages typically encountered. For example, in Hong Kong, whilst the main language

of interview is Cantonese (recorded in traditional Chinese script in the CATI system), some interviews are also conducted in English (recorded in English script). Respondents not using the main or other local dialect/ language or English are terminated. For response rate tracking purposes, these cases are logged as not being able to be contacted.

The master questionnaire script is provided to each country in English for local translation. A separate project executive is responsible for back-translation into English and subsequent checking against the master script.

In all countries other than Japan, the local Synovate office conducts the research. In Tokyo, the random interviews are undertaken by Nihon Total Telemarketing, and the booster interviews by Ipsos Japan.

#### Quality control

All countries are required to complete a quality control check of at least 30% of all interviews. Either the supervisor listens to the interview as it occurs, whilst monitoring that the interviewer is keying in the results to the questions; or the audio tape for the interview is listened to and checked upon; or the respondent is subsequently called back and responses checked.

## MINIMUM SAMPLE SIZES FOR ANALYSIS

Because of the change to quarterly reporting, the issue of minimum sample sizes has been of focus. Synovate has provided the following guidelines.

1. Statistical theory does not provide absolute rules that can be used to discriminate between a survey-based estimate that is reliable and one that is unreliable. The issue is one of probability and risk but it is reasonable to assume that decisions should not be based on statistics where their value is small relative to their sampling error.
2. Conventionally, media software 'flag' data where the implied sampling error is such that inferences cannot 'safely' be drawn from the survey. This flag is expressed as a warning and states that in the view of the data supplier [and, presumably, the software supplier] that the statistic is not based on a sufficiently large number of observations for it to be used without qualification [i.e. that there is a strong possibility that it is invalid].<sup>1</sup> Nonetheless, under this convention the user can still analyse and report the doubtful data albeit with the implied disapproval of the data supplier.
3. In an ideal world this convention would be a satisfactory way of dealing with market research estimates that are statistically weak. It might be argued, however, that this approach is insufficient in both a legal and moral sense. For example, in a court of law it might be argued that the data supplier by enabling the numbers to be used, has not taken sufficient precautions to prevent unsound survey figures being published that in turn could unreasonably cause commercial damage to a third party.
4. For this reason Synovate are recommending to their subscribers that the media software licensed to be used for the analysis of PAX survey data does not show those audience figures that failed to satisfy the minimum precision criteria as indicated by the sample size upon which the estimates are based. However, the current capabilities of the software are not adequate to meet our recommendation.
5. Because there is no absolute sample size that can be cited as a measure of statistical reliability, it is necessary for Synovate and its subscribers to agree on a figure such that when the actual sample size is below that figure, estimates are not used externally. This decision should balance the requirements of estimate validity and the need to provide as much insight [detail] into the market as is possible.
6. Synovate would recommend that this figure does not just take into account the number of observations that could potentially give rise to the incidence of viewing or reading [that is the sample base], but rather the number of observations that are positive events. The statistical argument for this is that the sampling error of estimates based on a small count of incidences can be approximated by the square root of the estimate itself, divided by the sample base. With this in mind Synovate would recommend to subscribers and all users of PAX data that no

---

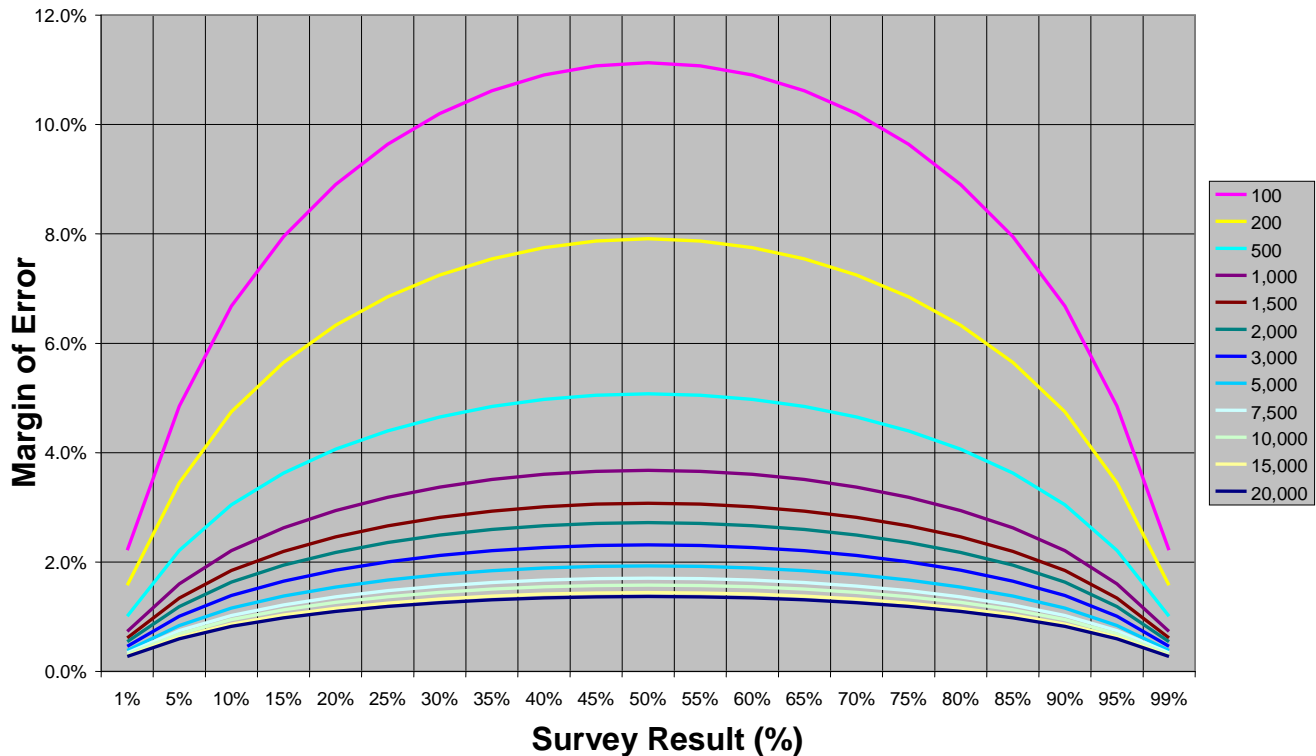
<sup>1</sup> Because it is both inconvenient and difficult to compute reliable estimates of the sampling error for a reported statistic within most media software, it has been conventional to substitute the sample size from which the statistic has been calculated, as a correlate of the sampling error. The drawback of this is that it does not take into account the important components of sampling error such as the design effect and the weighting effect.

projected estimate is used in any comparison or assessment for any commercial purposes which are based on less than 30 observations in total [sample base or cell size].

7. Further, we would recommend that whatever figures are adopted they apply consistently to both the 'reach and frequency' modules as well as the cross tabulation modules. It would also make sense that these numbers should also be used to define itemization.
8. Regardless of what software is used and what minimum samples can be "flagged", it is the responsibility of the individual user to ensure that the minimum sample sizes for externally released results are adhered to. That is, **do not use any sample of less than 30 respondents.**

## **STATISTICAL MARGIN OF ERROR**

### **95% Margin of Error for PAX Results**



All survey results are subject to a statistical margin of error, which manifests itself as an "allowance" that needs to be attached to each result. The above chart shows, for various sample sizes, the margin of error for a given survey percentage. These margins have taken into account WEFF (weighting effect).

For example, the margin of error for a survey percentage of 15%, based on a 20,000 sample, is 1%. Correspondingly, we say that the 95% Confidence Interval for the true population percentage is  $15\% \pm 1\%$ , i.e. it should range between 14% to 16%.

## **MEDIA DEFINITIONS**

The basic trading units of the PAX media currency are explained below. The basic units of "audience reach" form a framework upon which reach and frequency models of advertising campaigns can be built. The outputs of the modelled campaigns, in combination with the ratecards of specific media titles or channels, can in turn be used to derive such factors as cost efficiency.

All media reach definitions in PAX are based on the audiences of a title or channel. To qualify as a reader or viewer, the person must have read or viewed that specific title or channel. In other words, there is an "opportunity to see" advertising or promotional messages carried by that medium, as well as the editorial or programming content. Please refer to the questionnaire for the specific definitions used.

1. Average issue readership, or AIR. The number of people who read any issue of that title within its publication cycle. For example, a daily newspaper's audience (or reach, or AIR) is based on those respondents who claimed to have read a copy of the publication yesterday. For a weekly magazine, AIR is determined by the number of people who claimed to have read it in the past week.
2. Television audiences reported in PAX are based on those who claimed to have viewed a channel either yesterday, in the past week or in the past month.

These basic audience units are used in combination with frequency of exposure and other media metrics, to build up a picture of how audiences and exposures to the medium (or media) accumulate over time. The advertising decision maker is able to examine the effects of various combinations of media to determine what weight of campaign, and across which media and countries, is appropriate to meet the campaign's communication goals against the target audience.