2006 State of Software Measurement Practice Survey

NDIA CMMI Technology and Users Conference

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Software Engineering Institute | Carnegie Mellon

Agenda

Introduction

- Survey objectives & approach
- The population being studied
- Sampling plan

Results

- Response rates and outcome
- Population demographics
- Attitudes and beliefs about measurement use
- Measurement guidance that is used
- Measures that are reported

Summary Observations

Survey Objectives

The objectives of this survey are to characterize

- the degree to which software practitioners use measurement when conducting their work
- the perceived value of measurement
- approaches that are used to guide how measures are defined and used
- the most common types of measures used by software practitioners

Characteristics of the Survey

We used a structured, self-administered questionnaire that was available both via the World Wide Web and in paper form.

The questionnaire was designed to be short (17 questions) and easy-to-complete with questions phrased in close-ended format. Several questions allowed for short open-ended responses.

Stratified random sampling was used to select candidate respondents from a population comprised of members from three different subpopulations.

Candidate respondents were offered incentives to participate including

- platinum membership to the Software Engineering Information Repository (SEIR) that provides access to documents otherwise unavailable through regular membership
- early access to the survey results

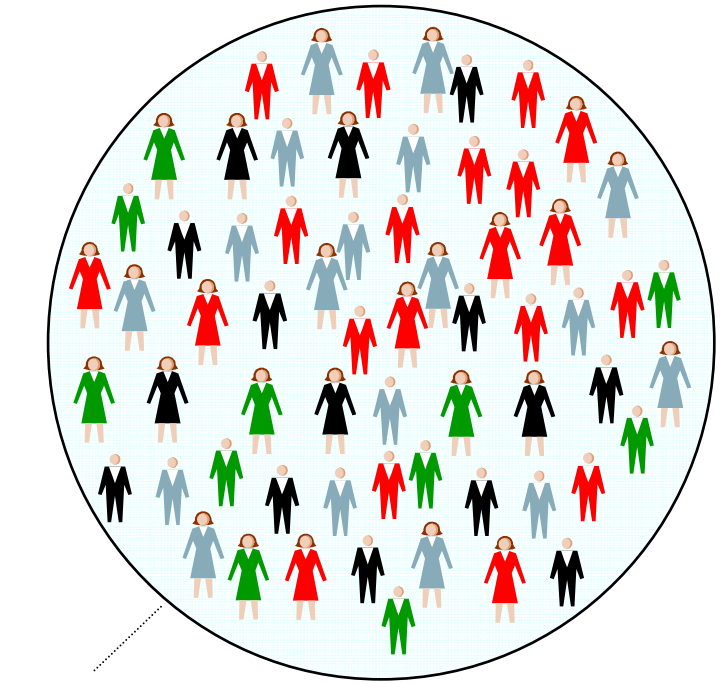
The Population Being Studied

The population that we would have *liked* to have studied is the entire existing body of software practitioners in the world. However, such a representative database was unavailable to us.

The population that we did use for this study included individuals who:

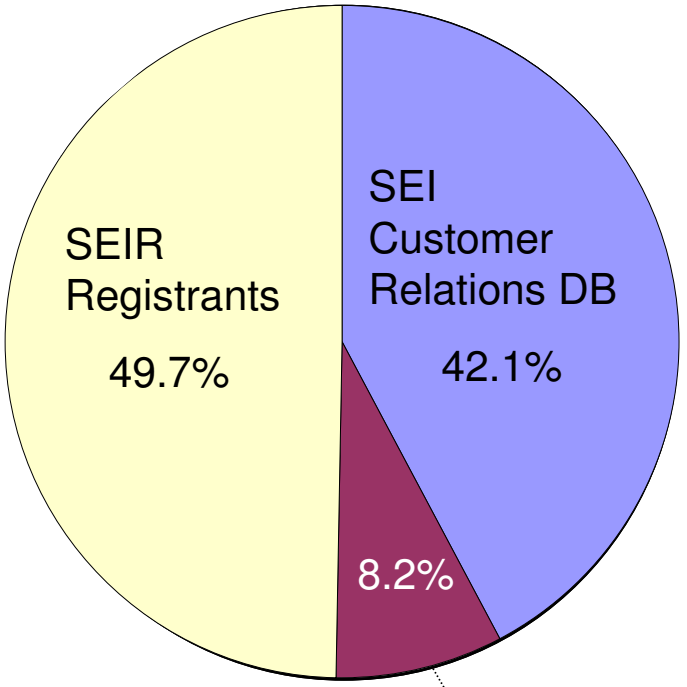
1. were entered into the SEI customer relations database during 2004-2005
2. registered to gain access to the SEI's Software Engineering Information Repository (SEIR) during 2004-2005
3. became an SEI Member during 2004-2005

Important to Remember When Interpreting Survey Results



Population of all software practitioners

These are not the same



SEI Members

Survey results can *not* be generalized beyond the population used in this study.

Sampling Plan

Subpopulation	Population Size	Sample Size	Adjusted Sample Size	Actual Sample Size
Customer Relations	6,398	603	2010	1670
SEI Members	1,242	434	1,242	951
SEIR registrants	7,540	612	2040	1539
Total	15,180	1,649	5,292	4,160

Calculated for:
precision of ± 2.5%
confidence of 95%

Adjusted based on estimated 30% response outcome.

- Invalid email addresses
- Non-responses
- Ineligible respondents

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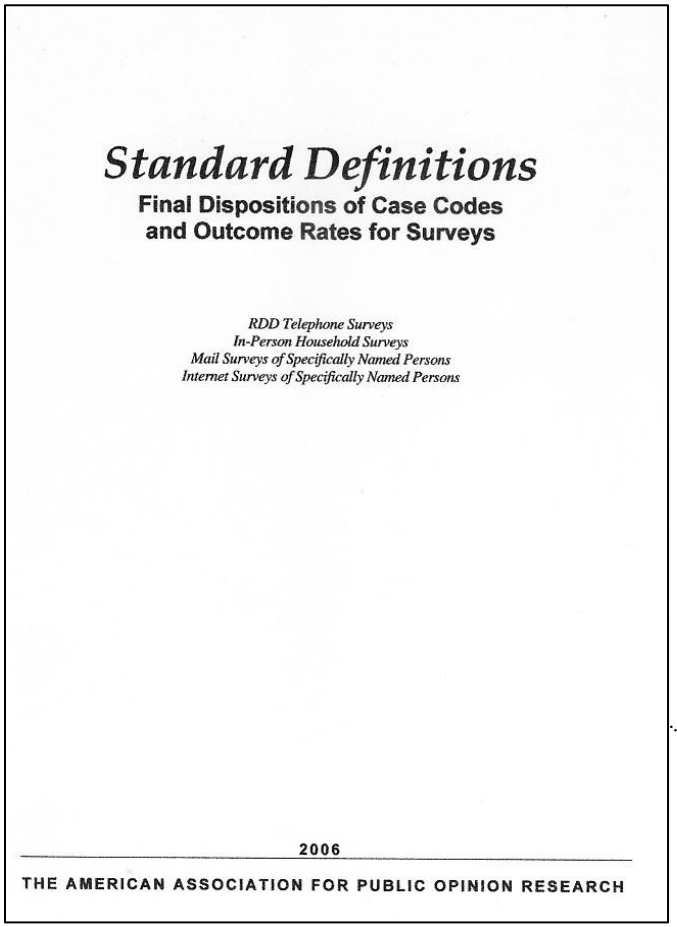
Response Outcome Rates



Minimum Response Rate

$$RR1 = 42.4\%$$

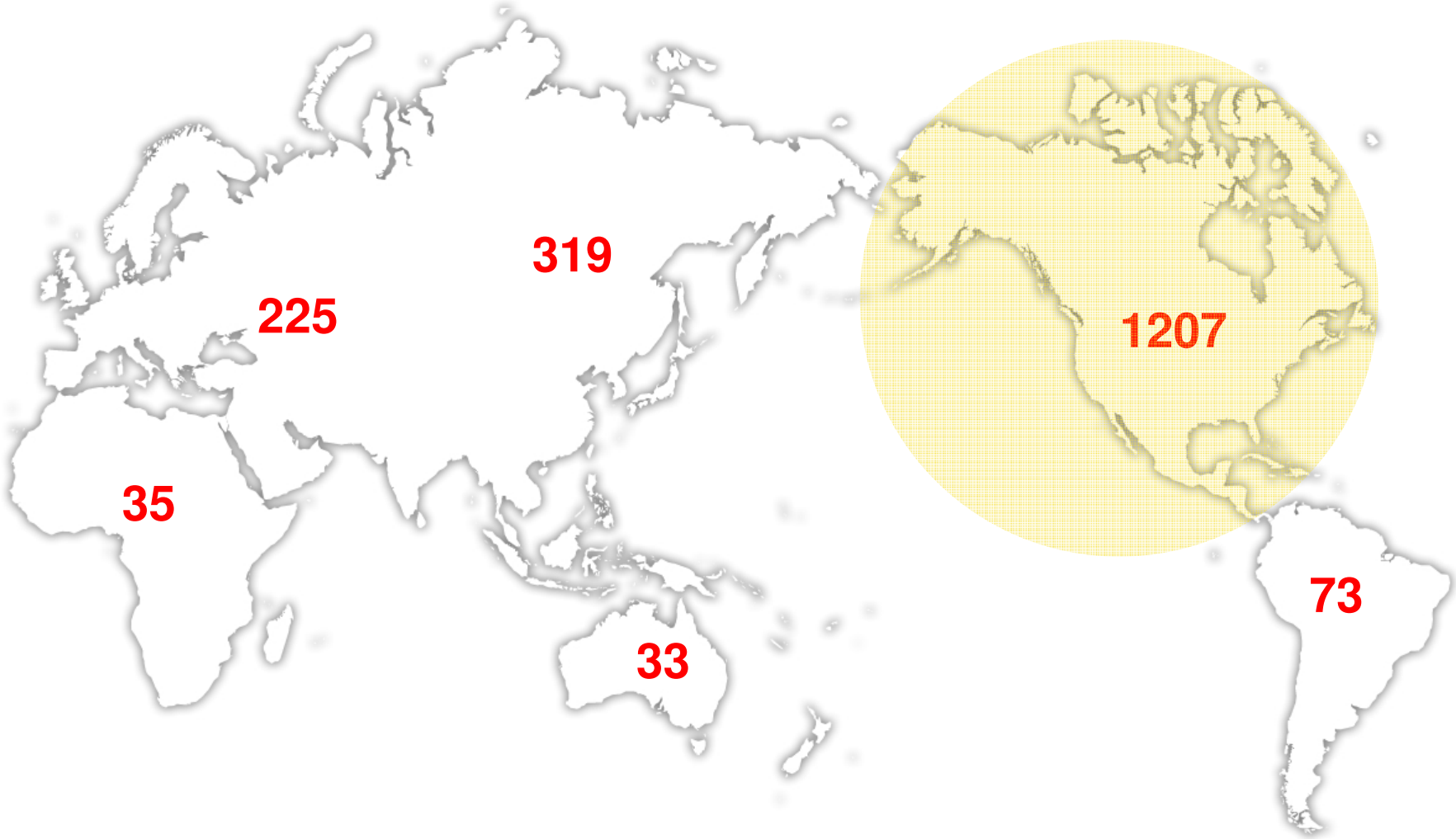
Counts partial interviews as respondents

$$RR2 = 50.7\%$$

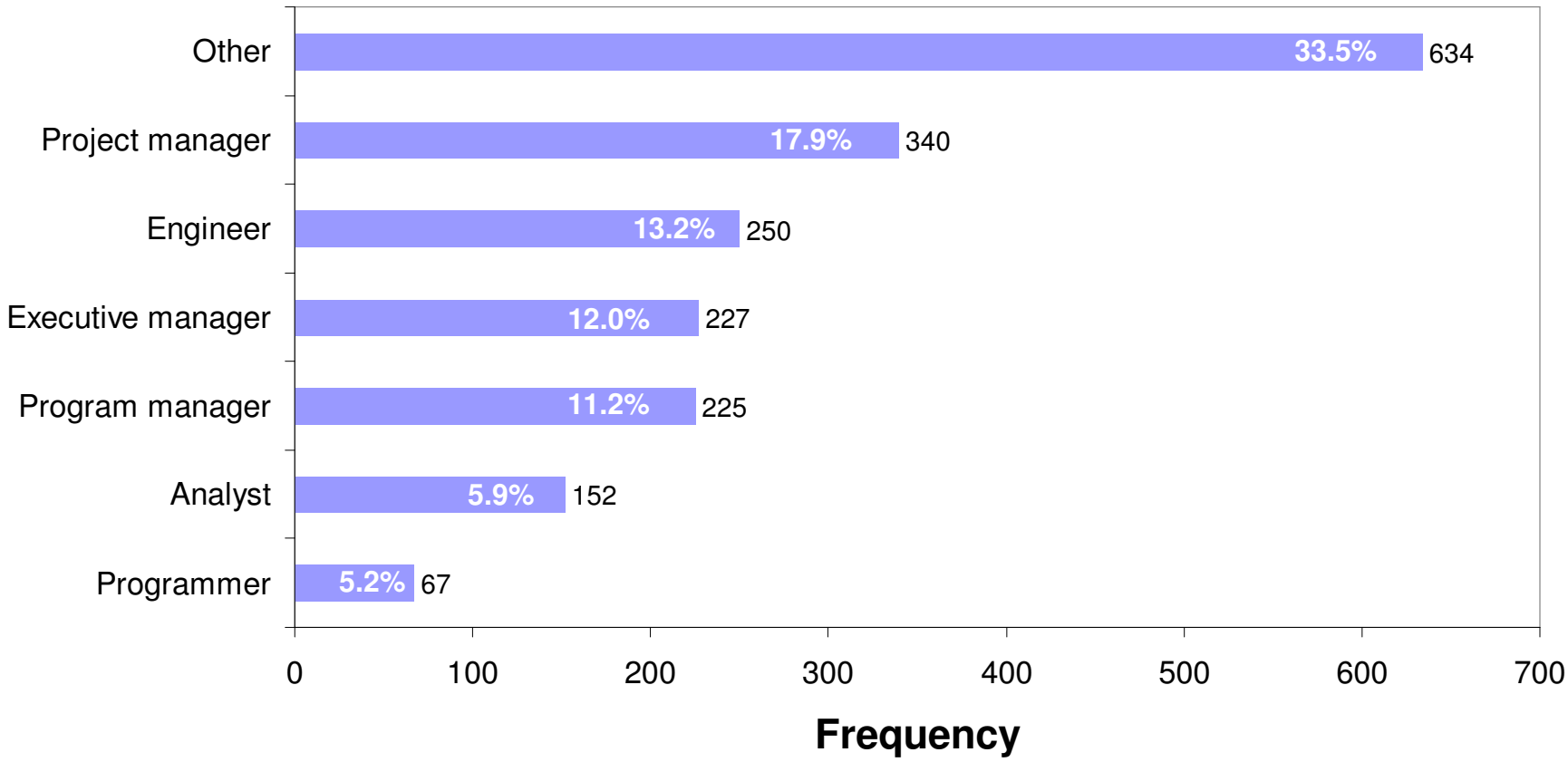
http://www.aapor.org/pdfs/standarddefs_4.pdf

84 Countries Represented

Respondents by Continent

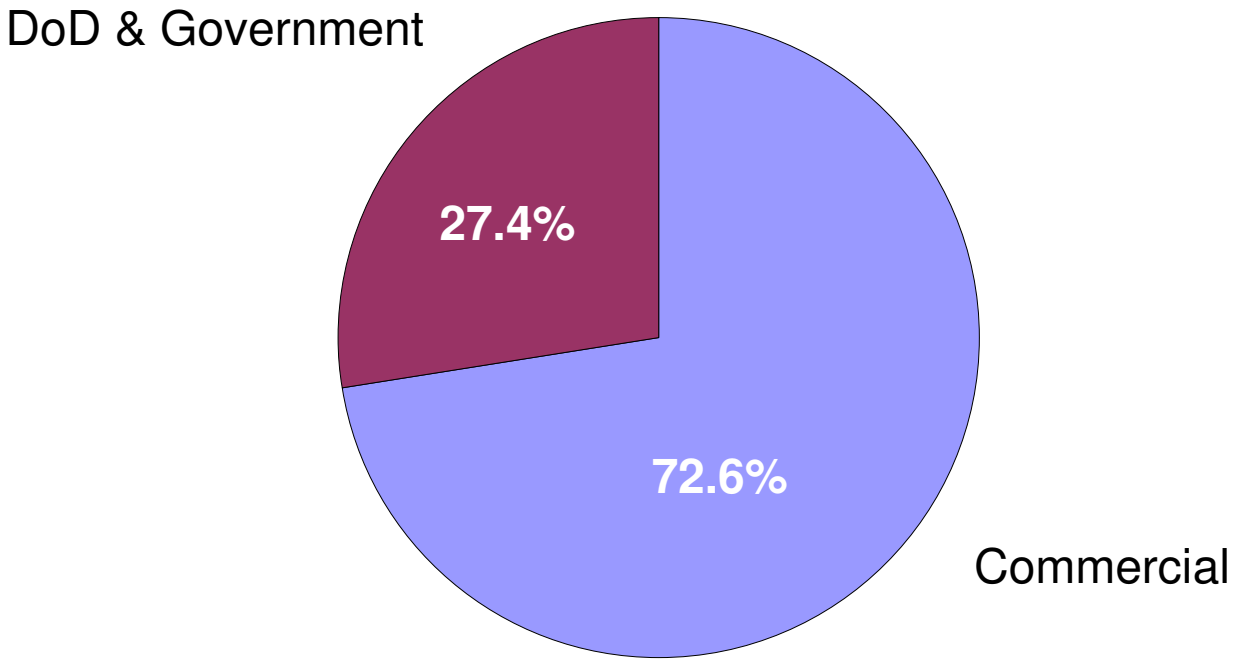


Survey Respondents



1895 Responses

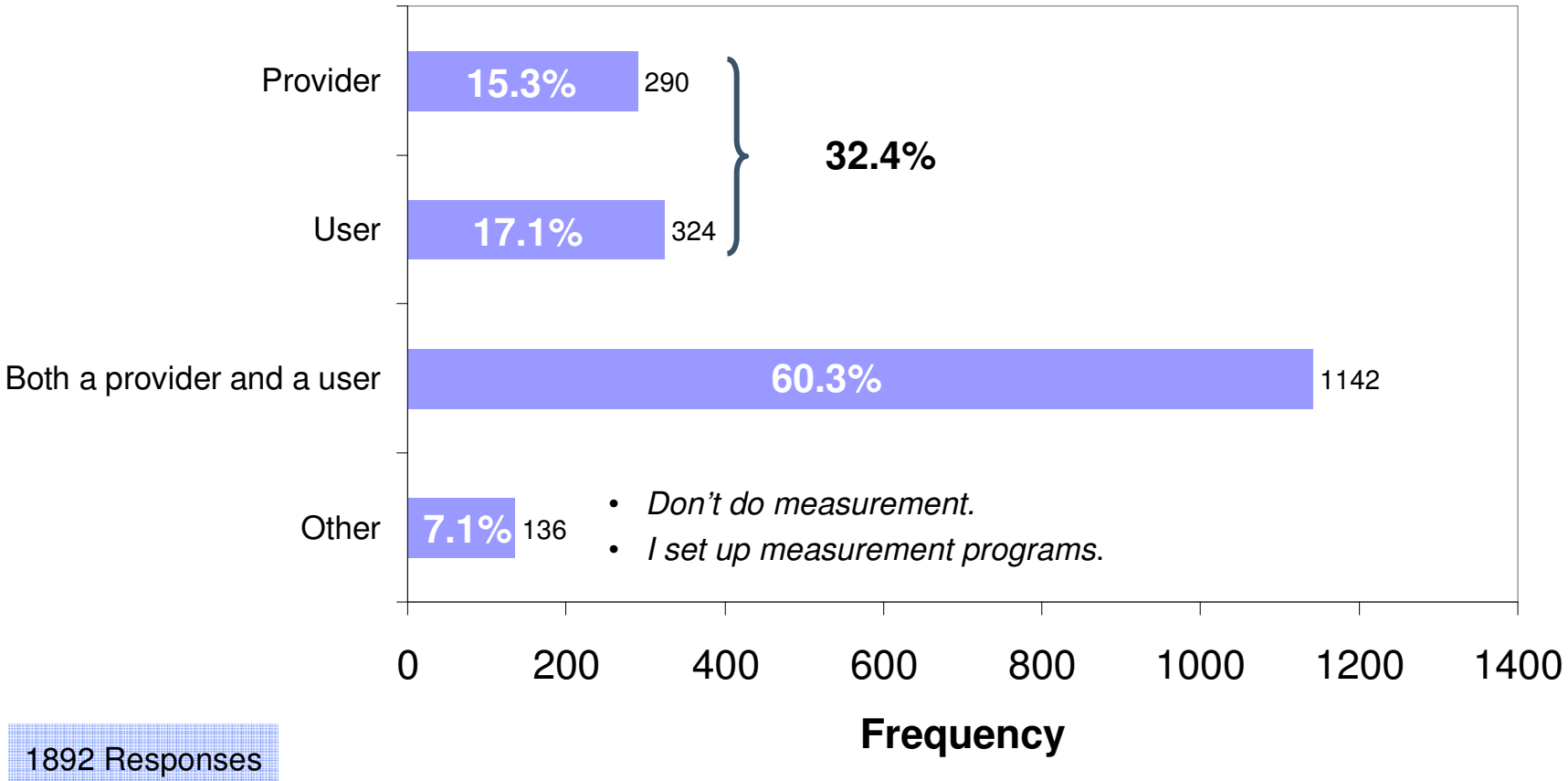
Approximate Population Proportions



Agenda

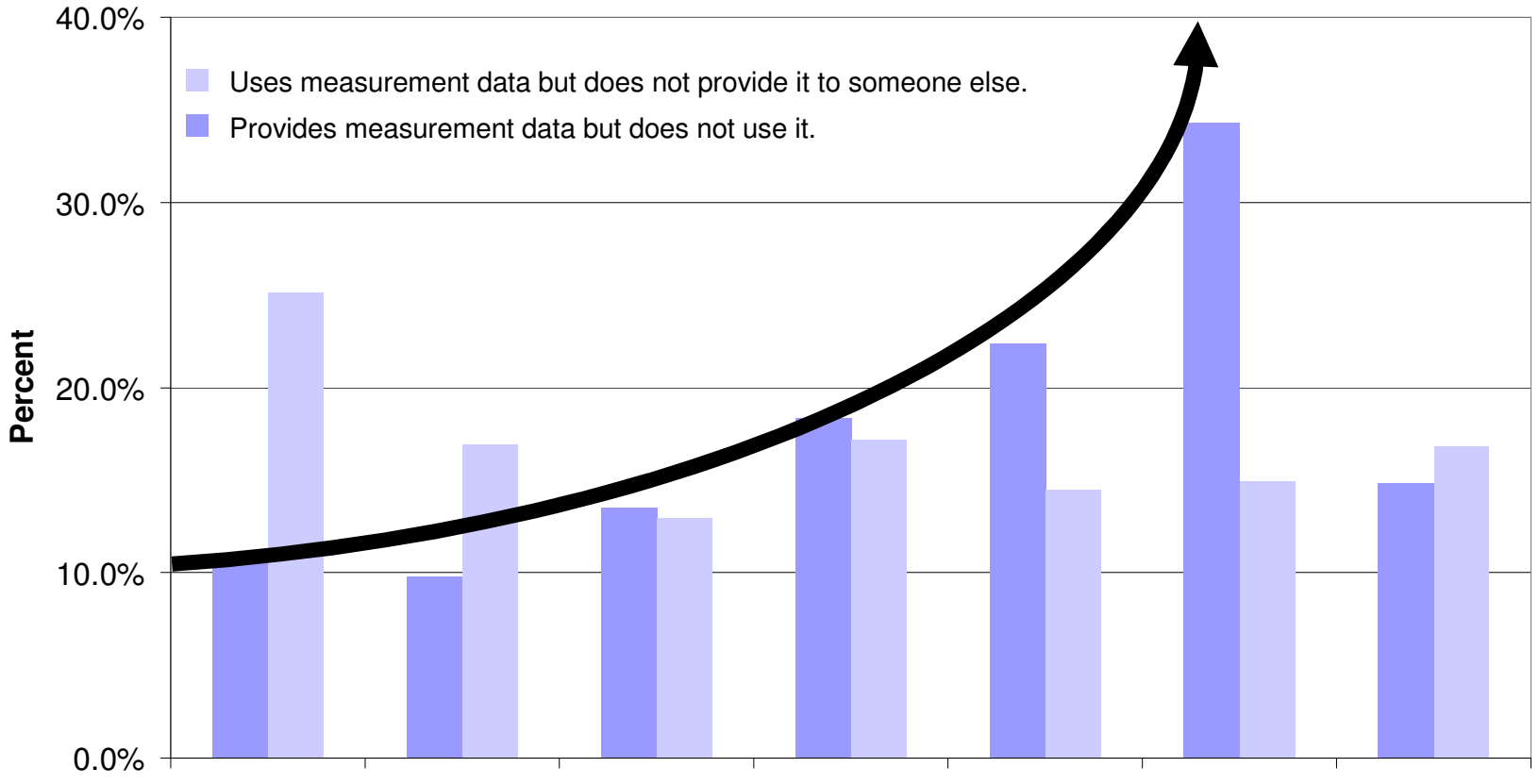
- Results
  - Response rates and outcome
  - Were subpopulations different?
  - Population demographics
  - Attitudes and beliefs about measurement use
    - *How are you involved with measurement?*
    - *Are purposes for measurement understood?*
    - *Does measurement help?*
    - *Is measurement used to understand product/service quality?*
    - *Documented measurement processes?*
    - *Measurement definitions understood and consistent?*
    - *Do measurable criteria exist for products and services?*
    - *Is corrective action taken when thresholds are exceeded?*
  - Measures that are reported

Involvement With Measurement



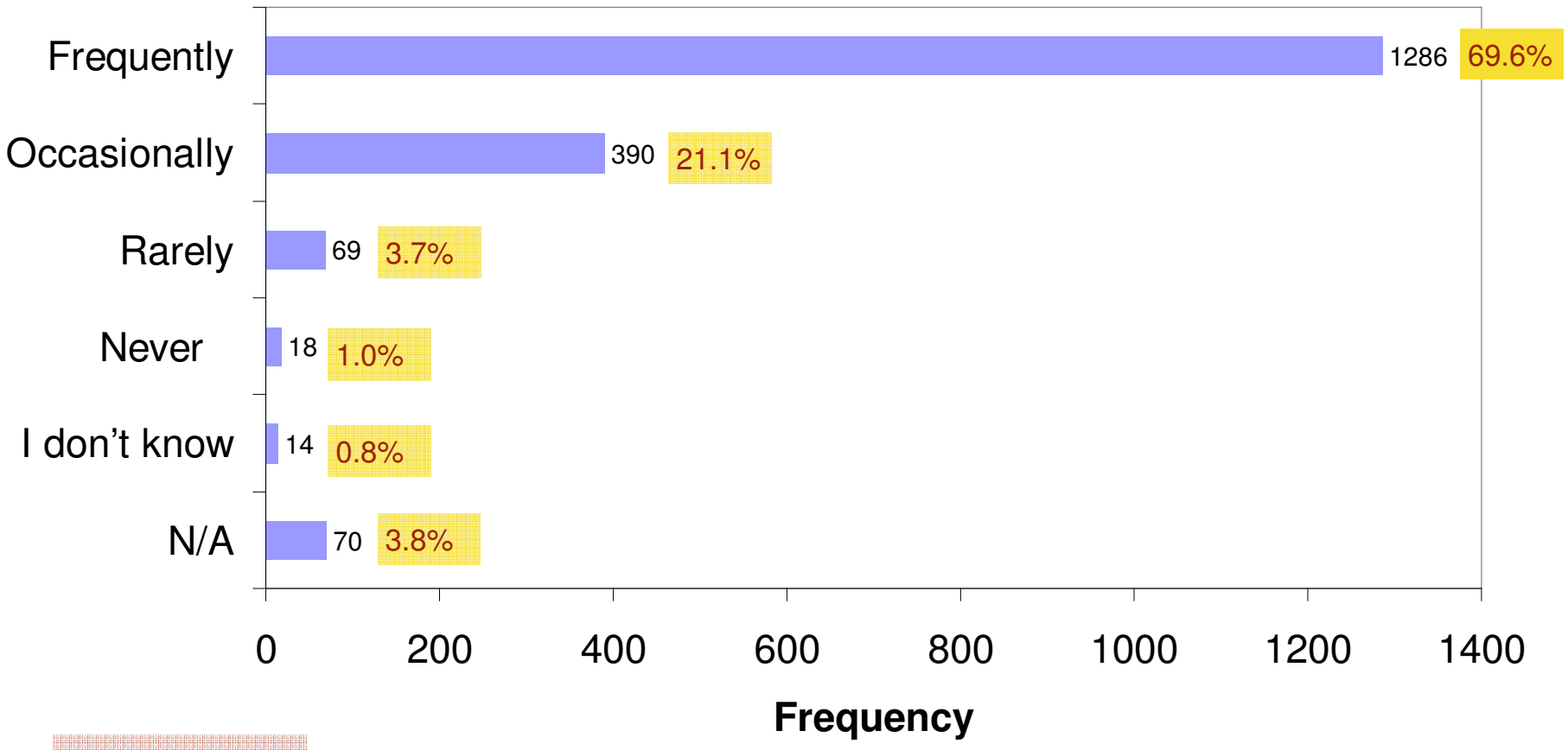
1892 Responses

Provides (only) or Uses (only)



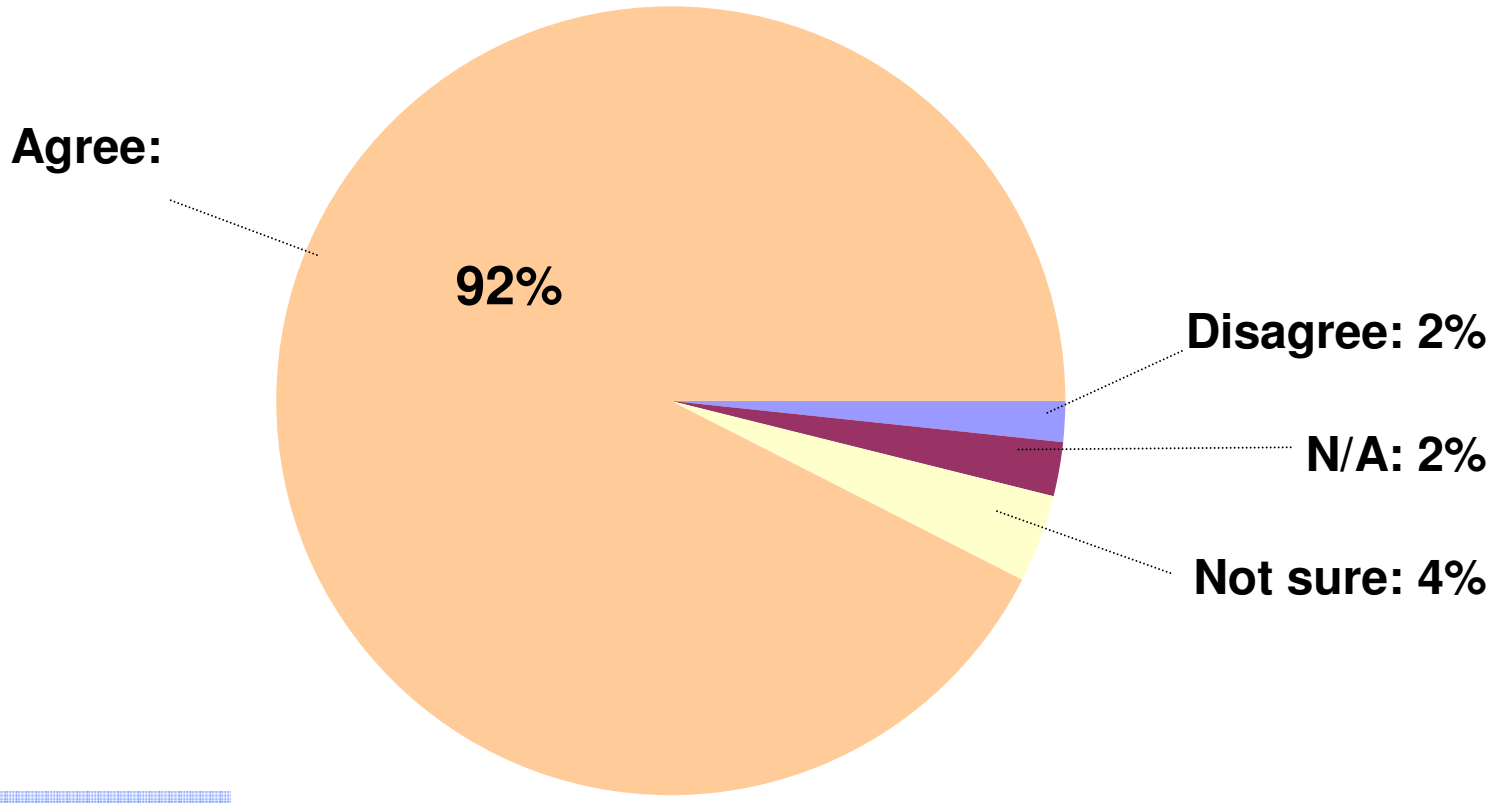
289 Provider
321 User

Purpose for Measuring Is Understood



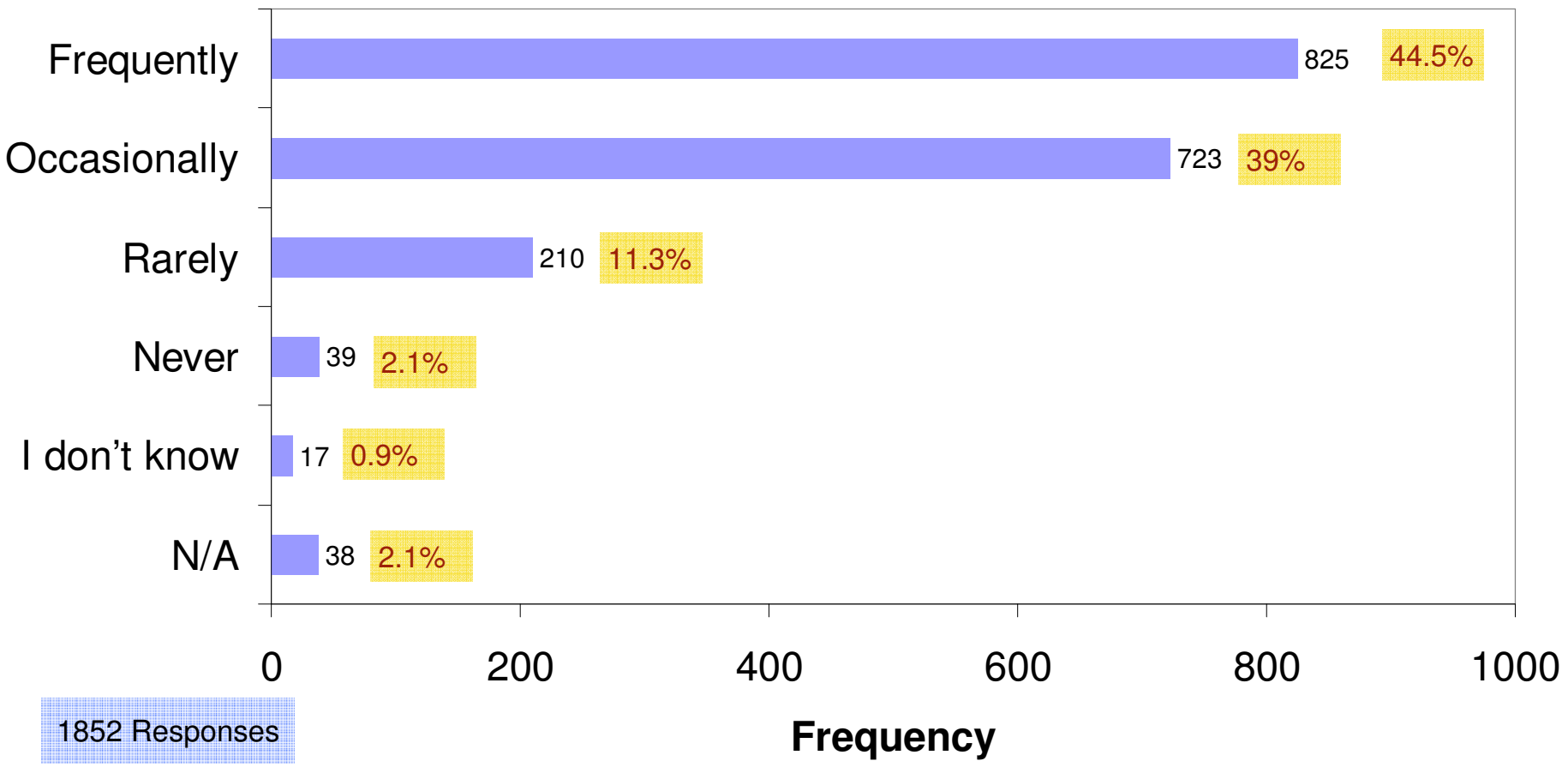
1847 Responses

Believe That Measurement Helps (To Some Degree)

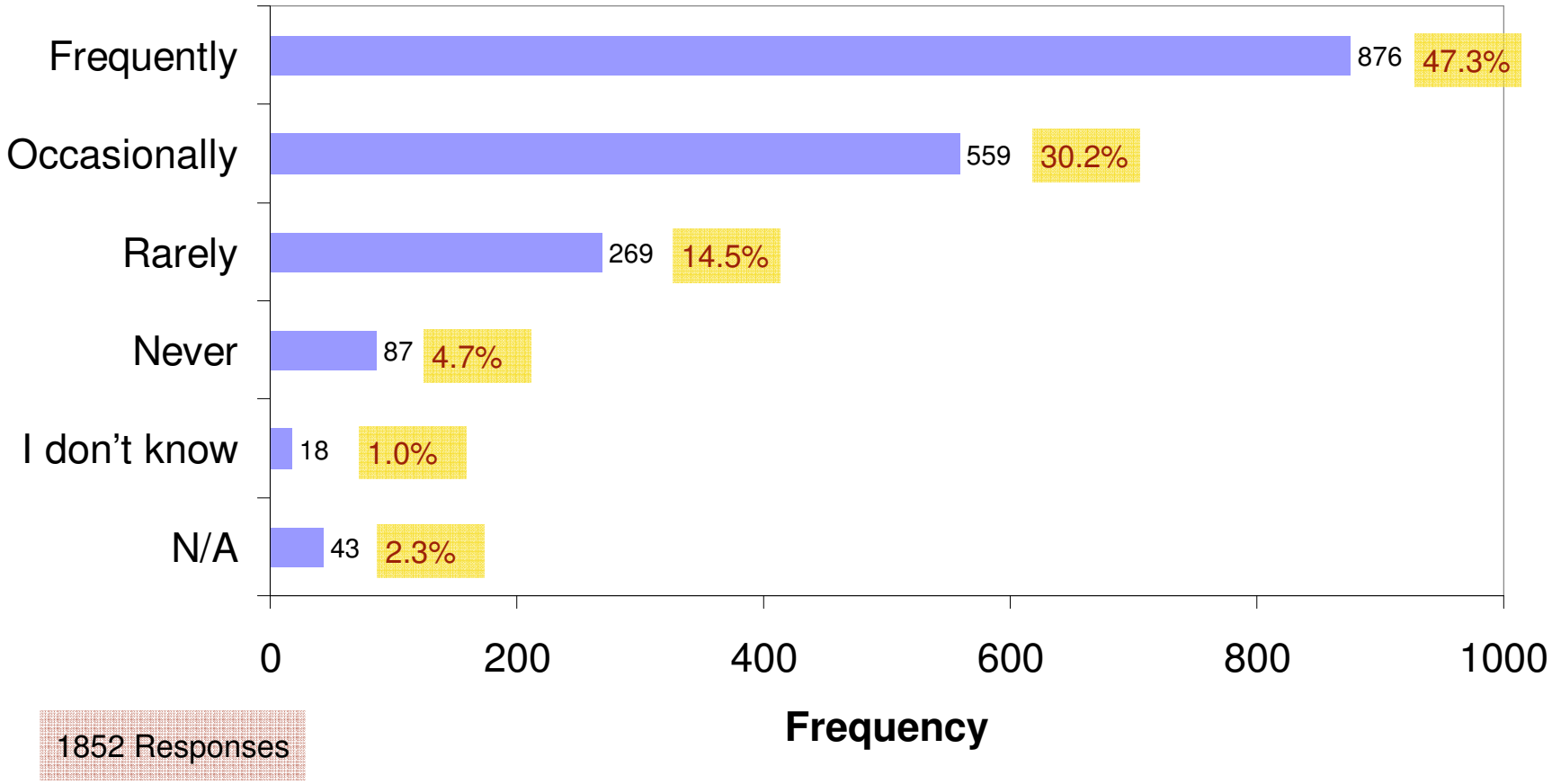


1868 Responses

Measurement Used to Understand Quality of Products & Services

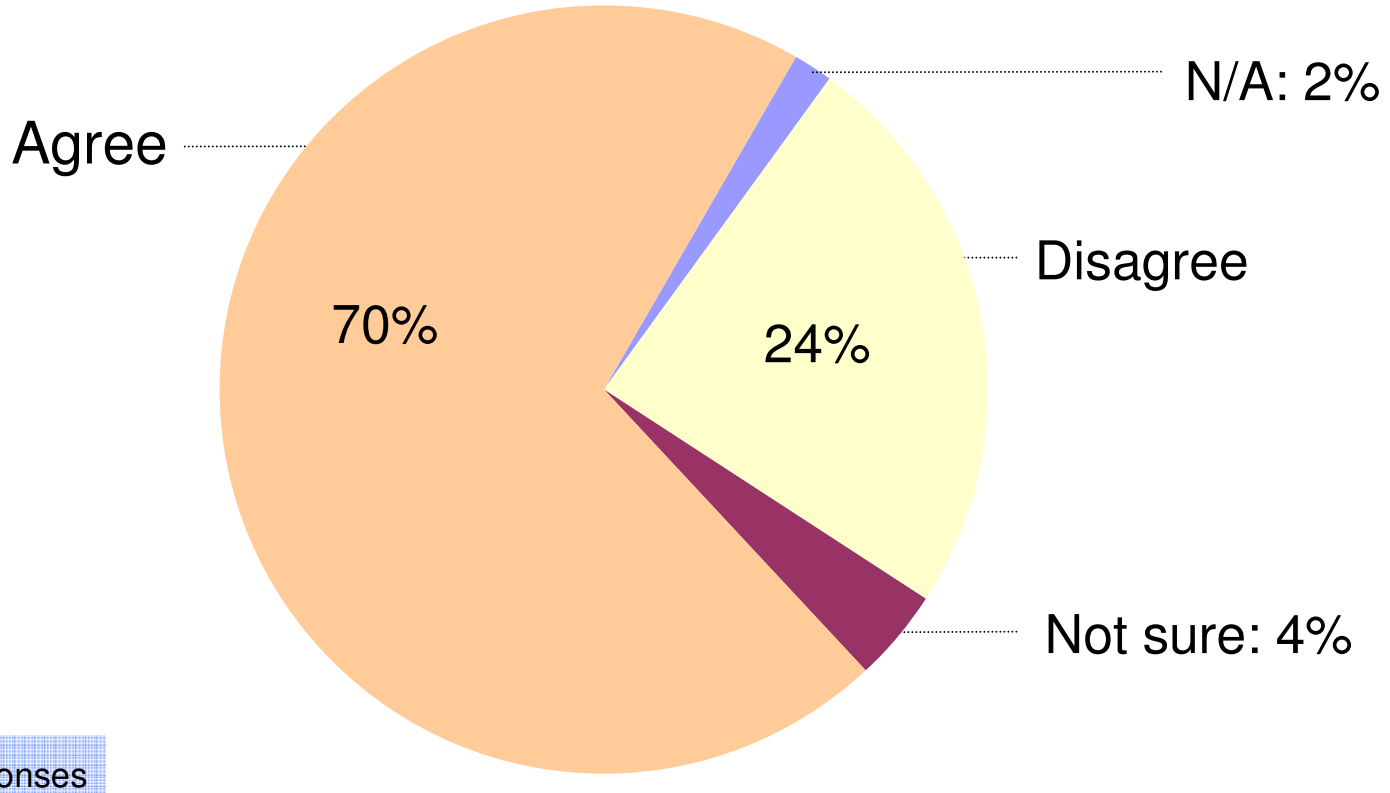


Documented Process for Collecting Measurement Data



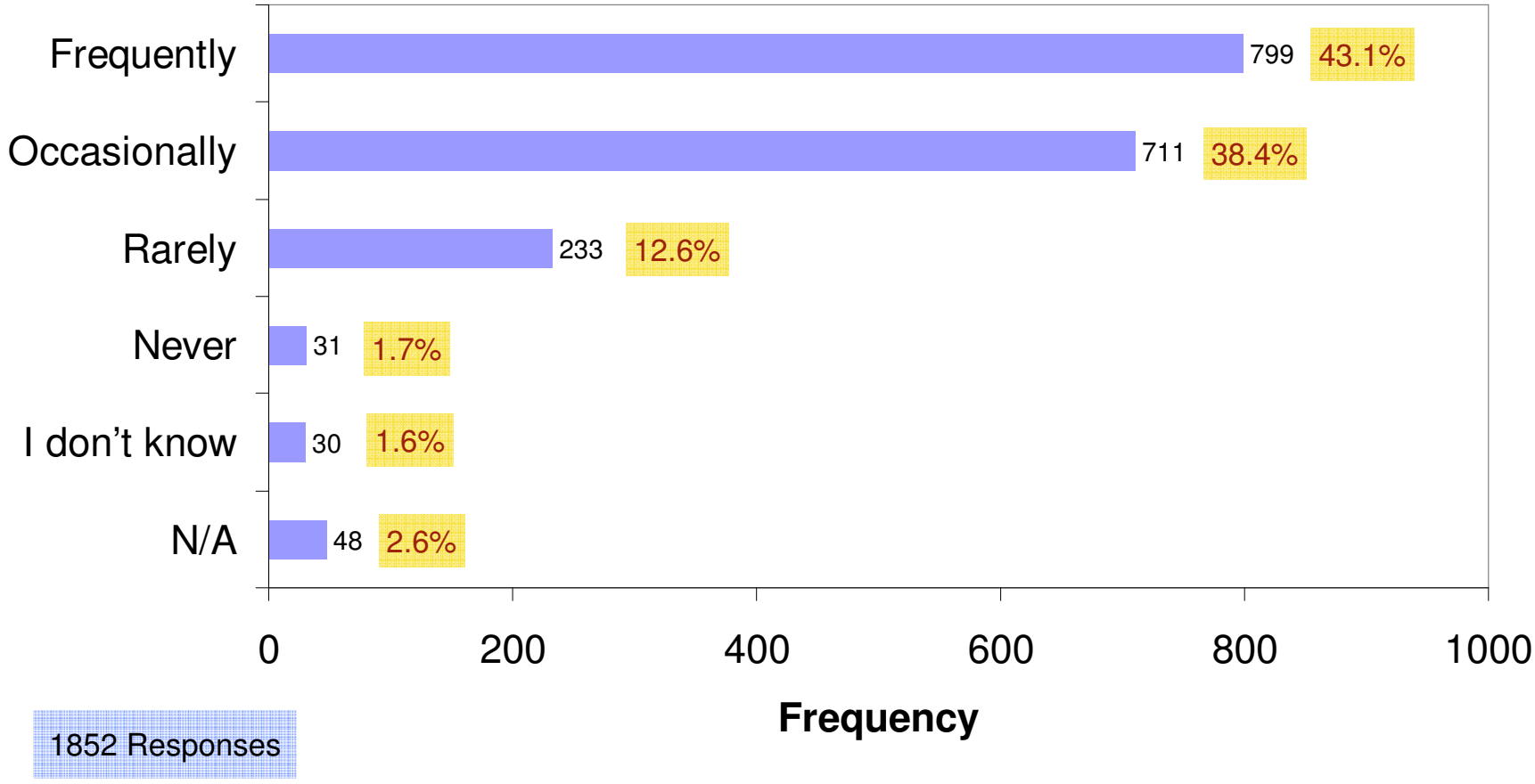
1852 Responses

Measurement Definitions Are Understood & Consistent



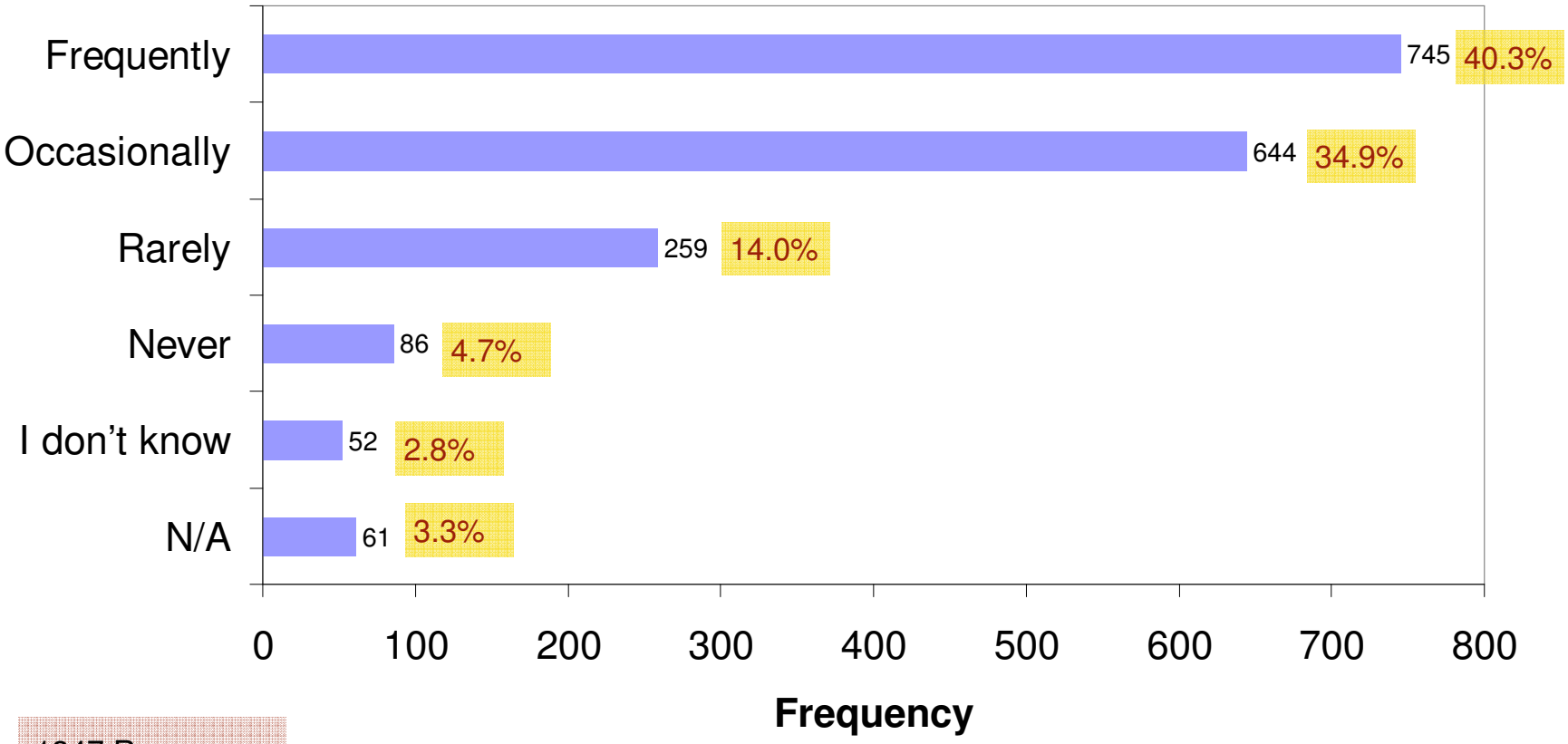
1868 Responses

Measurable Criteria Exist for Products & Services



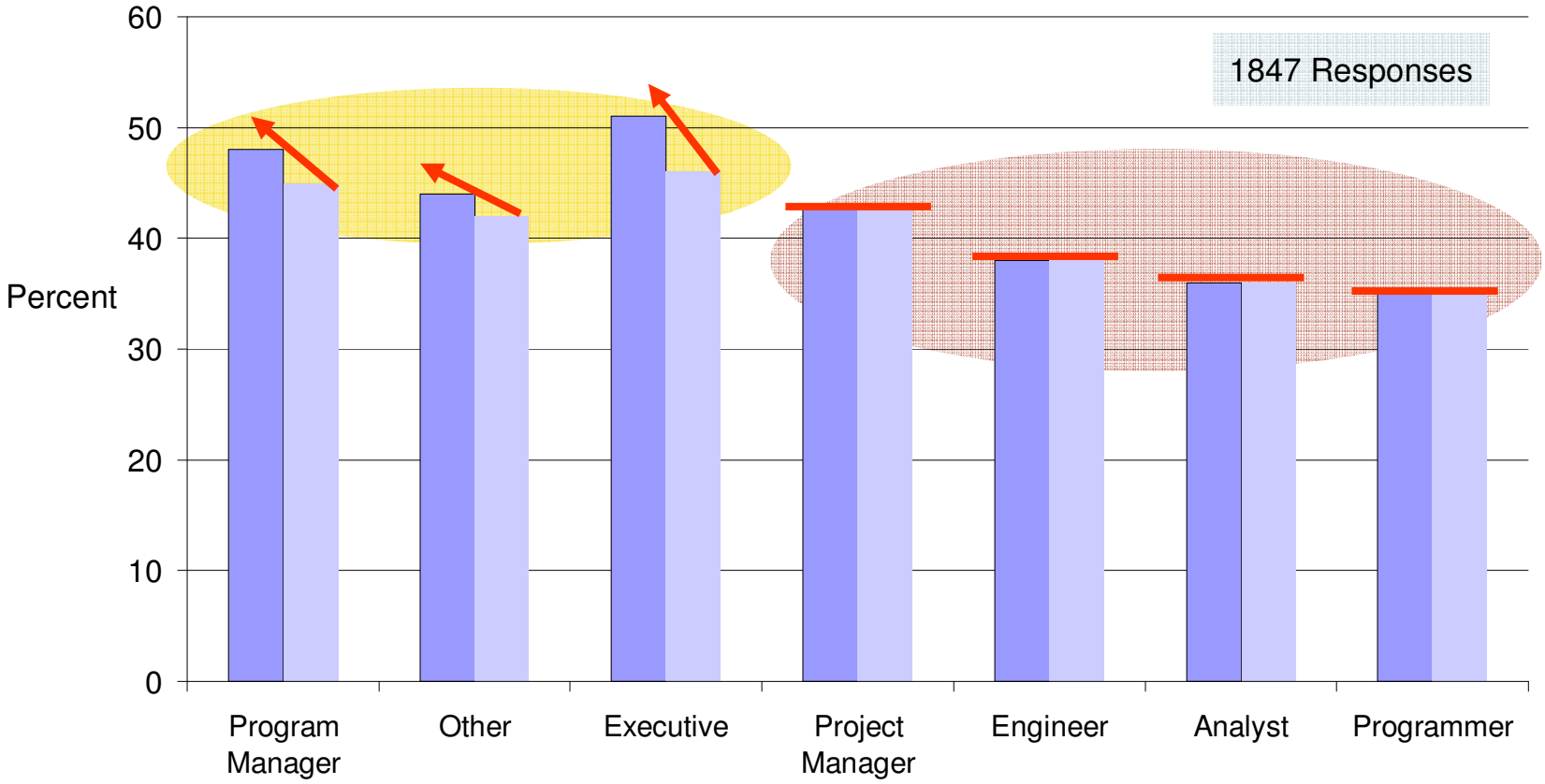
1852 Responses

Corrective Action Taken When Measurement Threshold Exceeded



1847 Responses

Action-Oriented Response to Measurement Information



- Measurable criteria established (frequently)
- Corrective action taken when threshold met (frequently)

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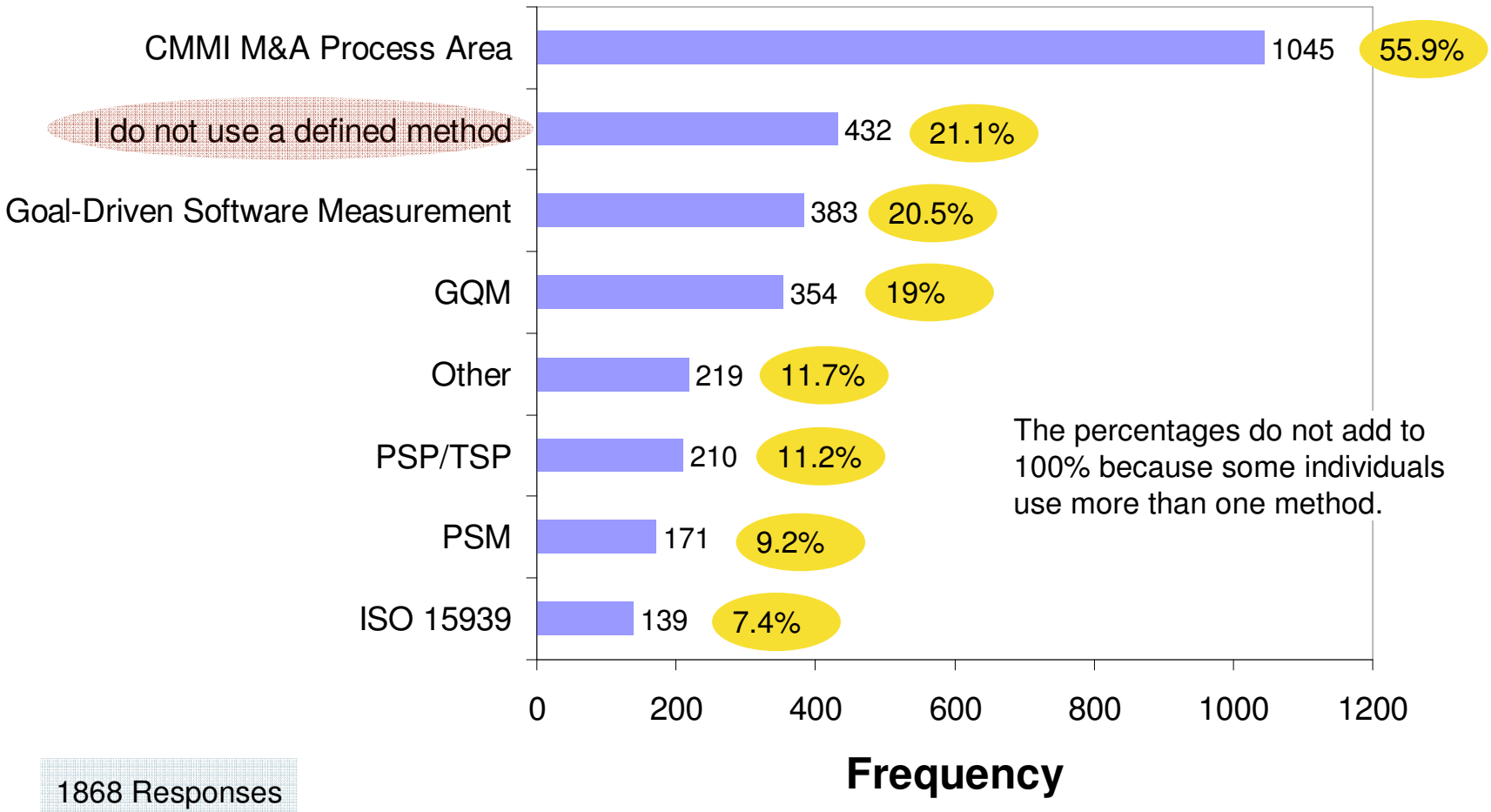
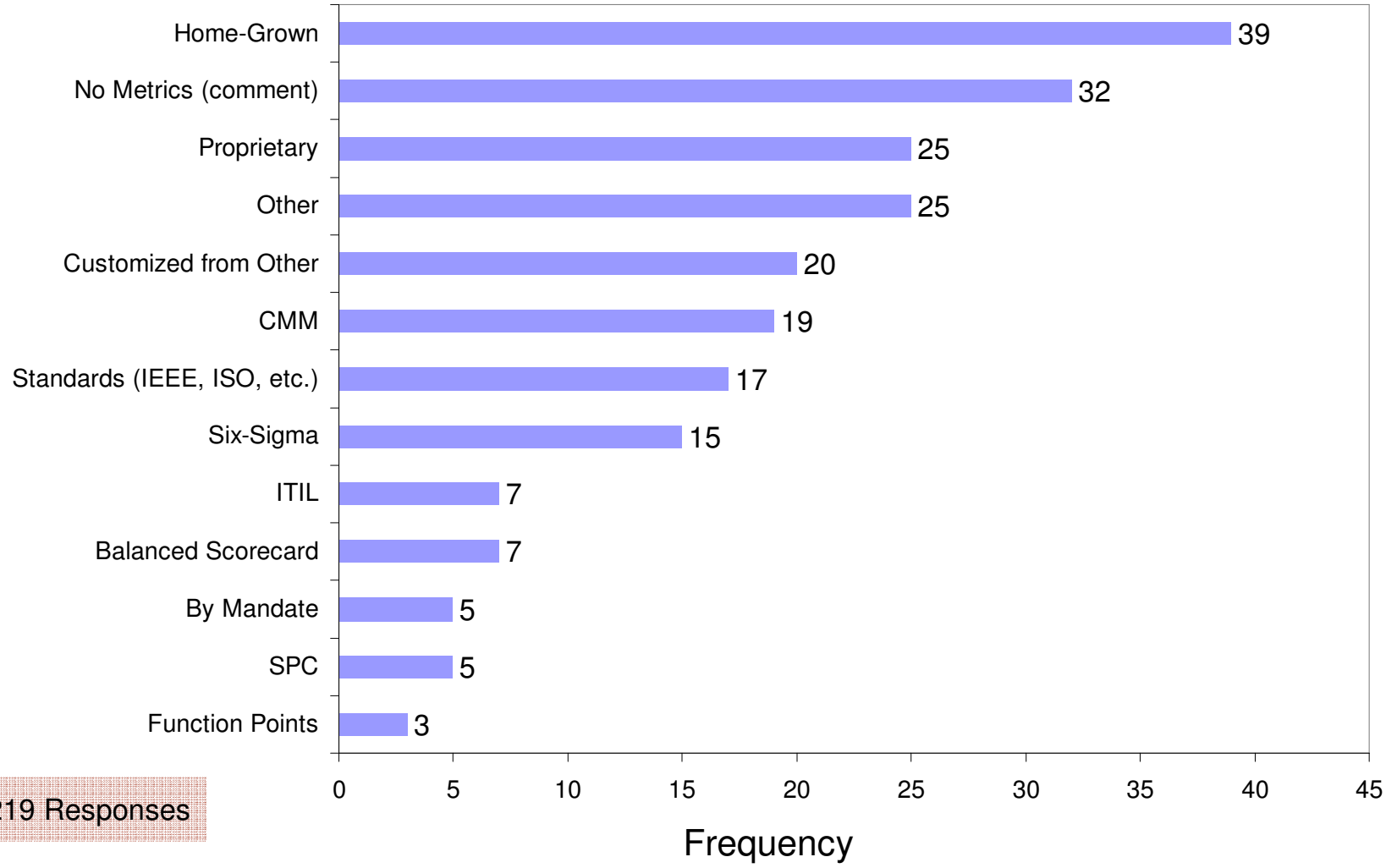
Measurement Methods Used



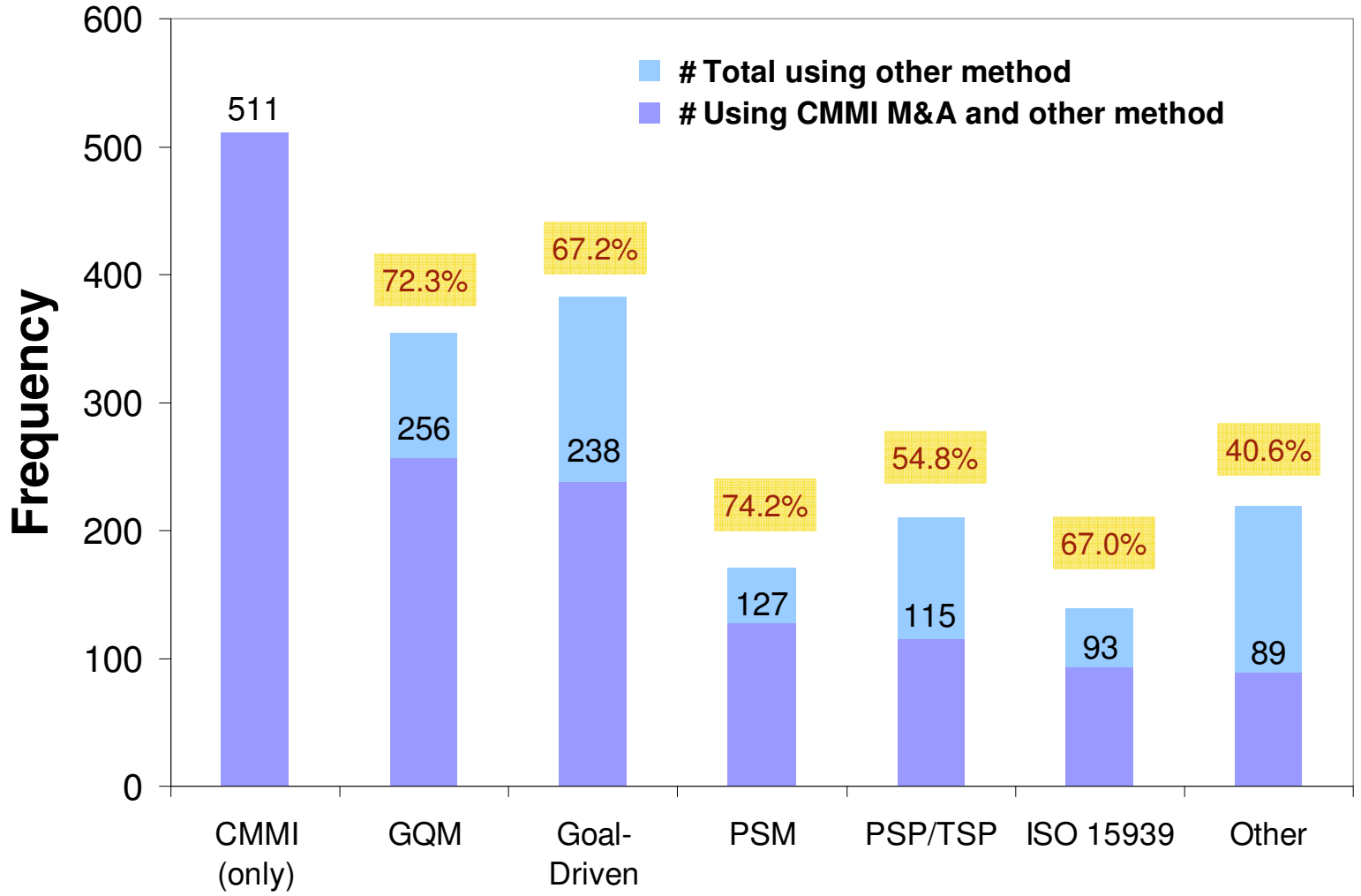
1868 Responses

“Other” Methods Used



219 Responses

Those Using "CMMI M&A Process Area"



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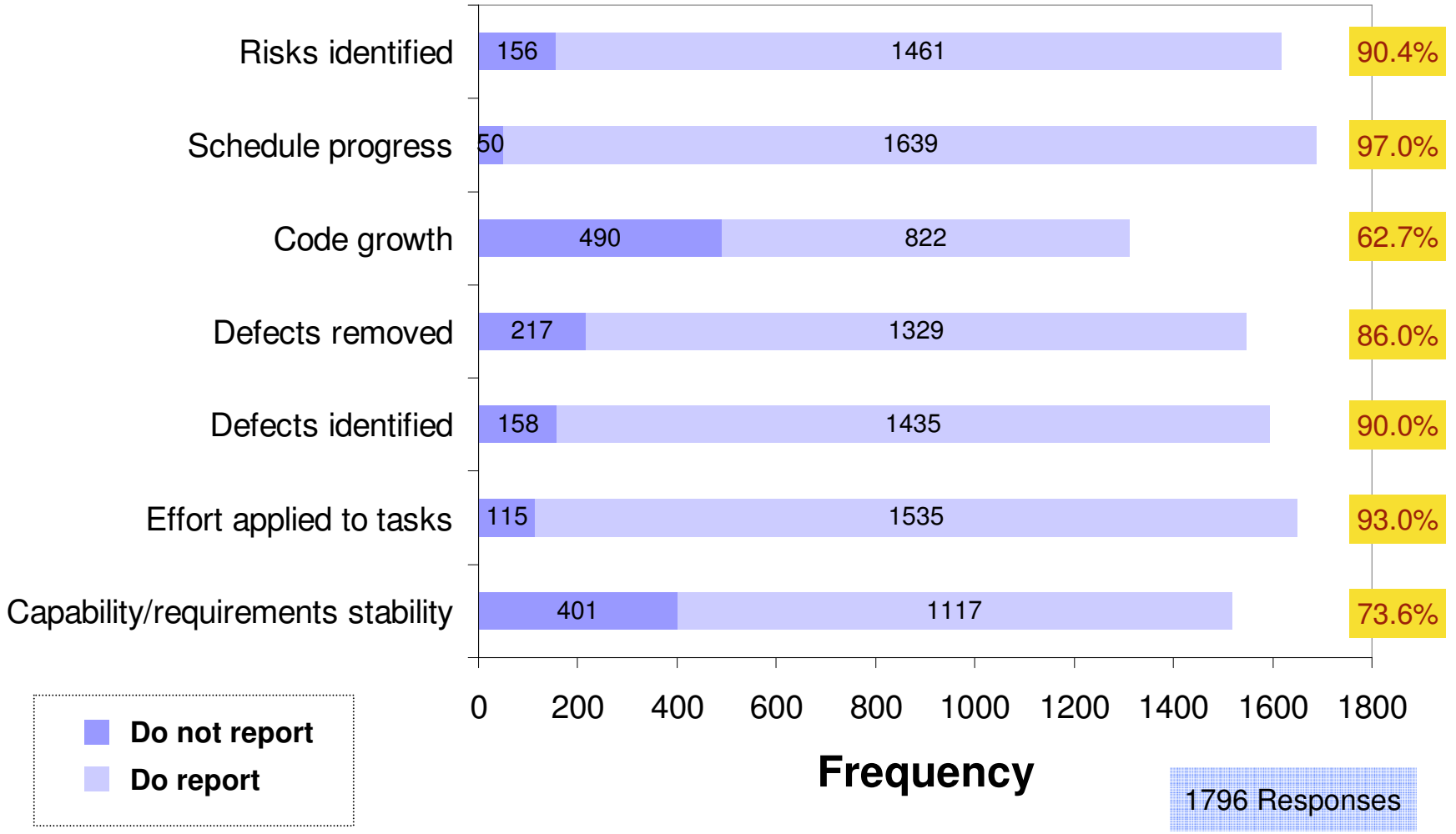
Measurements that Are Reported



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Influence of Role on Response - 1

In general, there were significant differences in response patterns when comparing management versus staff.

Management	Staff
Executive	Engineer
Program Manager	Analyst
Project Manager	Programmer

Statistical tests of significance demonstrated that the differences were significant with confidence of at least 99% in all cases (and 99.9% in some cases.

- Hypothesis test for equality of proportions
- Chi-Square test for significance

Influence of Role on Response - 2

When compared to staff, management responded more strongly that

- they understand the purposes for measurement
- measurement helps their team perform better than without it
- they use measurement more often to understand the quality of their products and services
- they follow a documented process more often for collecting and reporting measurement data
- measurement definitions are commonly understood and consistent in their organization
- measurable criteria exist for their products and services
- corrective action is taken when a measurement-based threshold has been exceed

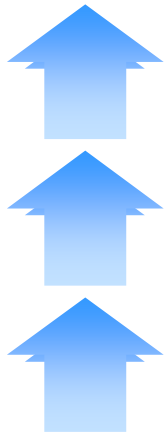
In general, the differences are statistically significant.

Influence of Organizational Size - 1

	Number in Organization		
	≤ 100	101 - 499	≥ 500
Using measurement-based data helps my team to perform better than without using it.	**78.4%**	**81.5%**	**86.8%**

** Percent that Agree or Strongly Agree.*

There exist measurable criteria for the products and services to which I contribute.	**37.0**	**46.4**	**54.7%**
I use measurement to understand the quality of the products/services that I work on.	**35.1%**	**41.1%**	**46.2%**
My team follows a documented process for collecting measurement data.	**65.7%**	**71.6%**	**72.1%**



** Percent that responded, "Frequently" to the listed questionnaire item.*

Comparing Industry to Government

	Industry	Government
Using measurement-based data helps my team to perform better than without using it.	**84.5%**	**80.0%**
Definitions of measures used in my organization are commonly understood & consistent.	**37.1%**	**31.9%**

** Percent that Agree or Strongly Agree.*

Differences statistically significant with confidence 95%.

Comparing USA to Other Countries

	USA	Other
Using measurement-based data helps my team to perform better than without using it.	**80.1%**	**85.9%**
Definitions of measures used in my organization are commonly understood & consistent.	**31.3%**	**42.4%**

** Percent that Agree or Strongly Agree.*

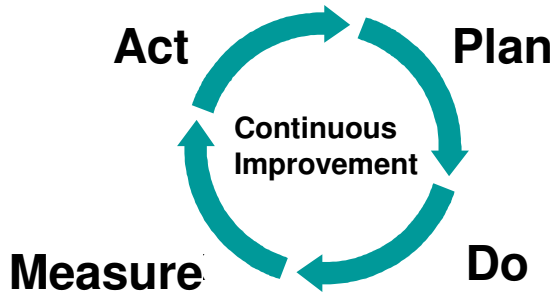
Differences statistically significant with confidence 99%.

Using Measurement to Improve

It is notable and a bit alarming that only 40.3% of all respondents reported that corrective action is taken when a measurement threshold has been exceeded.

Close to 20% of respondents reported that corrective action is rarely or *never* taken when a measurement threshold is exceeded.

Measurement doesn't help much unless the information is acted upon.



To be published this year:

The State of Software Measurement Practice: Results of 2006 Survey

TECHNICAL REPORT

CMU/SEI-2006-TR-009
ESC-TR-2006-009

Acknowledgements

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