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1<sup>ER</sup> CONGRESO NACIONAL  
DE MEDICIÓN Y  
ESTIMACIÓN DE  
SOFTWARE



# Functional Sizing in Brazil

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# Agenda

- About TI Métricas
- A Short History of Software Measurement in Brazil
- Why Brazilian Organizations Use Functional Sizing
- How Brazilian Organizations Use Functional Sizing
- Benefits and Challenges

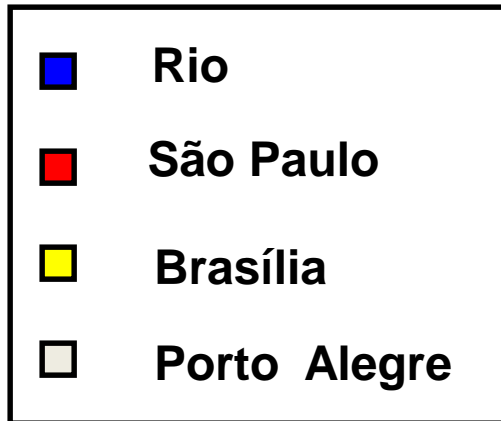
# About TI Métricas

# Company Information

- Software Measurement Company
  - Based in Brazil (Rio, Sao Paulo, Brasilia & Porto Alegre)
  - Services:
    - **Function Point Counting** (main service)
    - Project Estimation (several methods, featuring COCOMO II)
    - Productivity & Benchmark Studies
    - PSM(\*) Consulting and Training
    - FP Consulting and Training (IFPUG FP, SNAP, COSMIC FP)
  - Some Numbers:
    - 70+ employees (50+ IFPUG Certified)
    - Averages 70,000 FPs counted per month
  - Client Areas:
    - Government
    - Insurance
    - Health
    - Finance & Banking
    - Airline
    - Telecom
    - Energy

(\*) Practical Software & Systems Measurement

# Where We Are

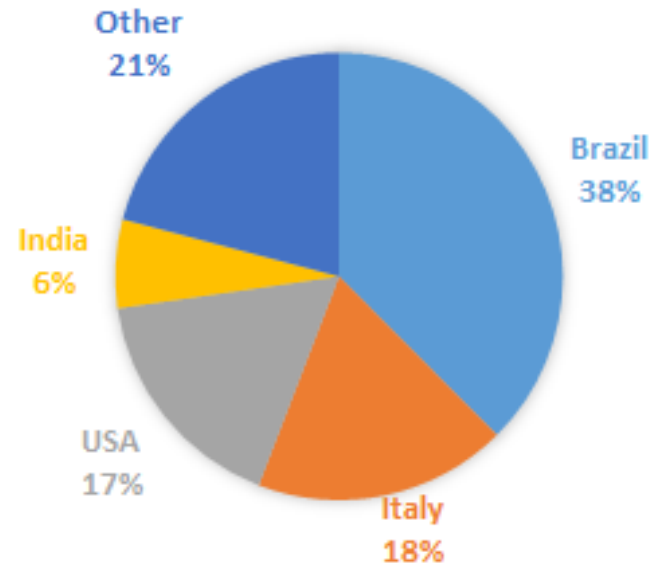


# A Short History of Software Measurement in Brazil

# Brazil – #1 in IFPUG Members, CFPS & CSP



IFPUG MEMBERSHIP BY COUNTRY  
MAY 2015 - TOP 4



Brazil has **34%** of all CFPS/CFPP and **33%** of all CSP

Source: IFPUG office, May 2015

# Brazil – COSMIC Certifications



Brazil has **26** COSMIC Certified Professionals

(12 from TI Métricas)

More to come!

Source: COSMIC website, August 2015



# A Short History

## The First Wave

- 1989 - First Brazilian company joins IFPUG (UNISYS)
- 1991 - First Brazilian FPA User Conference
- 1992-1996 - 7 more user conferences
- 1996 - First CFPS exam in Brazil (3 CFPS)



# A Short History

## The Second Wave



- BFPUG founded in 1998
- Local CFPS exams from 2001 to 2007
- IN04 (Brazilian Government) in 2008
- Automated CFPS exams since 2008
- ISMA 5 in Brazil (São Paulo) in 2010
- Number of CFPS over 300 in 2012
- First COSMIC Exam 2012

# A Short History

## The Second Wave



- ISMA 8 in Brazil (Rio) in 2013
- Second COSMIC Exam in 2013
- First SNAP Exam in 2013
- IN04 updated in 2014
- ISMA 11 in Brazil (Sao Paulo) in 2015

# A Short History

## The Third Wave

- More organizations transition to functional sizing
- Several functional sizing methods coexist
- Non-functional measurement methods appear



# A Short History

## “Instrução Normativa 04/2014” – Main Points

- The company measuring the services cannot be the same company providing the services.
- Person-hours cannot be used to measure effort unless justified. Effort must be associated with products conforming to pre-defined quality and schedule criteria.
- Contracting job positions is not allowed.
- Electronic bidding used whenever possible.

In 2014, **90%** of all government agencies audited by the “Tribunal de Contas da União” made contract payments as a function of objective measurement of results.

# Why Brazilian Organizations Use Functional Sizing

# Why Use Functional Sizing

## Who Controls Price

- All other factors assumed constant, price will be controlled by the:
  - Vendor
    - Process-oriented pricing - “This costs a lot because it takes many hours to make”
  - Client
    - Results-oriented pricing - “This costs a lot because of these valuable features”

# Why Use Functional Sizing

## Clients Like to Be in Control

- Why does this software change cost so much?
  - Process-oriented perspective
    - “Because I will have to spend 2,000 person-hours on it”
  - Results-oriented perspective
    - “Because I will have to change 200 function points”



# Why Use Functional Sizing

## Clients Get to Be in Control

- Functional sizing is results-oriented
- Functional sizing can be understood and verified by the client
- Functional size measures can be standardized
- Functional size measures can be benchmarked

# How Brazilian Organizations Use Functional Sizing

# Types of Models

- Explanatory Models
  - Used to understand behavior
  - Mostly used by economists, researchers & social scientists
  - Example: modeling productivity as a function of several variables to guide process improvement initiatives

# Types of Models

- Predictive Models
  - Used to predict future behavior
  - Used by estimators
  - Example: modeling effort as a function of size & productivity to obtain estimates

# Types of Models

- Prescriptive Models
  - Used to regulate relationships
  - Used in business agreements
  - Example: Establishing productivity values for software development pricing; setting prices based on the value of a function point
  - These are not estimating models!

# Types of Models

## Predictive x Prescriptive Models

Estimating (Predictive Model)	Pricing (Prescriptive Model)
1. Estimated value should be close to actual	1. Prescribed value should be close to actual
2. Method is expected to give approximate results	2. Method is expected to give exact results
3. Different estimators may produce different values (depending on their expertise and skill)	3. Different model operators must produce the same values
4. Input values do not need to be objective – may depend on estimator's opinion/assessment	4. Input values must be objective – must not depend on estimator's opinion/assessment

# FP-based Business Models

- Business Model
  - A ‘way of doing business’
- FP-Based Business Models used in Brazil
  - Estimating Models
  - Pricing Models

# FP-based Business Models

## Estimating Models

- Basic
  - Use FPs and a simple linear model to estimate effort
- Parametric
  - Use FPs as input to parametric models to estimate effort & schedule
    - COCOMO II, SEER, SLiM, etc.
- Other
  - Any method that uses FP size as input to estimating



# FP-based Business Models

## Pricing Models

- Productivity-based Model
  - **Productivity** measures the effort to develop a function point
  - Calculations:
    - Effort (H) = Size (FP) \* Productivity (H/FP)
    - Price (\$) = Effort (H) \* Hourly Rate (\$)

# FP-based Business Models

## Pricing Models

- Price per Function Point Model
  - A specific price per function point is established for each project type
  - Price is computed as
    - $\text{Size (FP)} * \text{Unit FP Price (\$/FP)}$

# FP-based Business Models

## Pricing Models

- **Baseline-based Model**
  - A specific price per function point per month is established for an installed application base
  - A fixed monthly fee is charged for a service set (e.g., application maintenance/support)

# FP-based Business Models

## Other Models

- Defect-based Model
  - A price reduction (penalty) is associated with a defect threshold
  - The threshold is typically based on a defect density measure (e.g., defects per FP)

# FP-based Business Models

## Other Models

- Negotiation-based Model
  - Client obtains a value from an estimation model
  - Client accepts supplier's bid if lower than estimated value; otherwise negotiation applies.

# FP-based Business Models

## Other Models

- Phase-based Model
  - Not all organizations contract all project phases
  - Effort may be broken down by project phase
  - Phase percentages are typically based on historical data

# Benefits and Challenges of Using FP-based Business Models

# Benefits & Challenges

## Benefits

- Improves current practice ('better than before')
- Drives productivity up
- Transparent
- Objective
- Standardized
- Can be benchmarked
- Supported by both not-for-profit & for-profit orgs
- Good for any technology/process



# Benefits & Challenges

## Challenges

- Initial productivity determination (particularly if no data is available)
- Non-functional items (FPs may not be applicable)
- Requirements interpretation (fix poor requirements)
- Counting rules interpretation (certification helps)

# *Gracias!*



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<http://www.metricas.com.br/downloads>