When Metrics Mean Business

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Agenda

- **About** TI Métricas
- A Short **History** of Software Measurement in Brazil
- **Why** Brazilian Organizations Use Functional Sizing in Software Development Contracts
- **How** Brazilian Organizations Use Functional Sizing in Software Development Contracts

Agenda

- **Technical Considerations** Related to the Use of Functional Sizing in Software Development Contracts
- **Benefits and Challenges** of Using Functional Sizing in Software Development Contracts
- **Summary**

About TI Métricas

Company Information

- Software Measurement Company
  - Based in Brazil (Rio, Sao Paulo, and Brasilia)
  - Services:
    - **Function Point Counting** (main service)
    - Project Estimation (COCOMO II)
    - Productivity Studies
    - PSM(*) Consulting and Training
    - FP Consulting and Training (IFPUG & COSMIC)
  - Some Numbers:
    - 70+ employees (51 IFPUG Certified)
    - 60,000 FPs counted per month
  - Client Areas:
    - Government - Finance & Banking - Telecom
    - Insurance - Airline - Energy

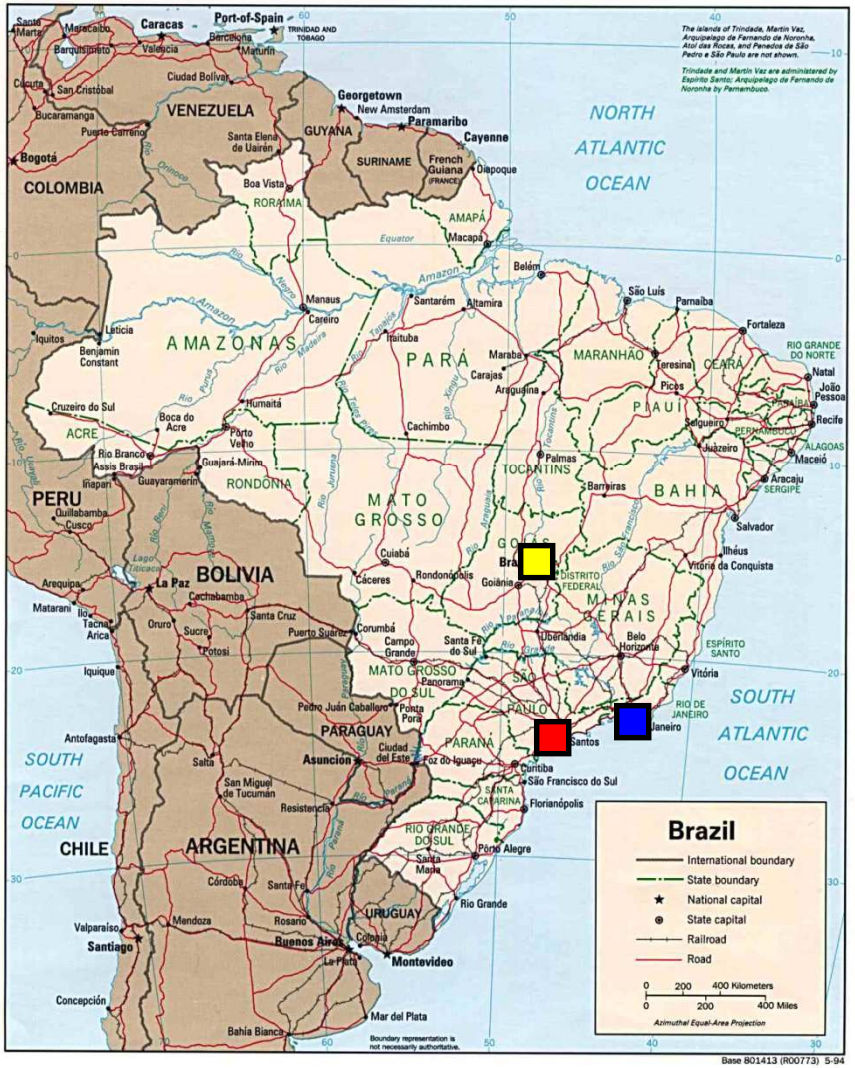
(*) Practical Software & Systems Measurement

Value Proposition

- Support Organizational Change
  - Before Change
    - Effort-based billing
      - Supplier gets paid based on effort (hours)
  - After Change
    - Size-based billing
      - Supplier gets paid based on results (function points)
- Advantages
  - Objectivity - Transparency
  - Benchmarking - Requirements improvement
- Challenges
  - Non-functional items - Bad requirements

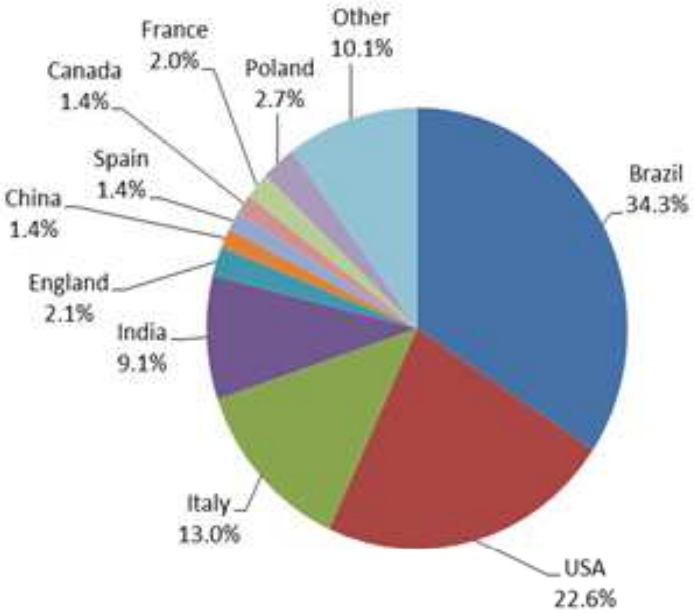
Where We Are

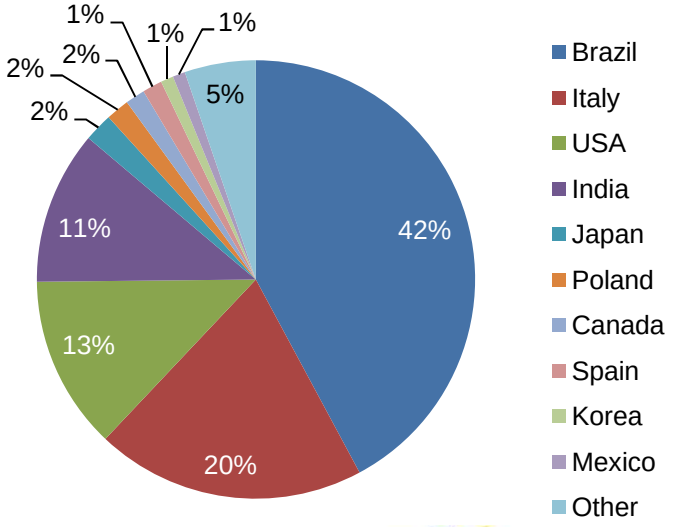
- Rio
- São Paulo
- Brasilia



A Very Short History of Software Measurement in Brazil

Brasil - #1 in IFPUG Members & CFPS





A Little 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 Little History
The Second Wave

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

A Little History
The Third Wave?

- More organizations transition to functional sizing
- IFPUG and COSMIC methods coexist
- Non-functional measurement methods appear (SNAP? Others?)

Why Brazilian Organizations Use Functional Sizing in Software Development Contracts

Why Use Functional Sizing
Who Controls Price

- All other factors assumed constant, price will be controlled by the:
  - Vendor
    - Process-oriented pricing - "This will cost more because I will have to hire an expert to do it"
  - Client
    - Result-oriented pricing - "This will cost more because of these added features"

Why Use Functional Sizing
Clients Like to Be in Control

- Clients like to control price... (who doesn't?)
  - Process orientation
    - "Is this guy really an expert? How much does he cost?"
  - Result orientation
    - "This extra feature provides great value!"

Why Use Functional Sizing
Clients Like to Be in Control

- Why does this change cost so much?
  - Process orientation
    - "Because I will have to spend 2,000 person-hours on it"
  - Result orientation
    - "Because I will have to change 200 function points"

Why Use Functional Sizing
Clients Get to Be in Control

- Functional sizing is result-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 in Software Development Contracts

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 (e.g., COCOMO II effort multipliers) 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 fixed productivity values for software development pricing; setting prices based on the value of a function point
  - These are not estimation models!

FP-based Business Models

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

FP-based Business Models
Estimation Models

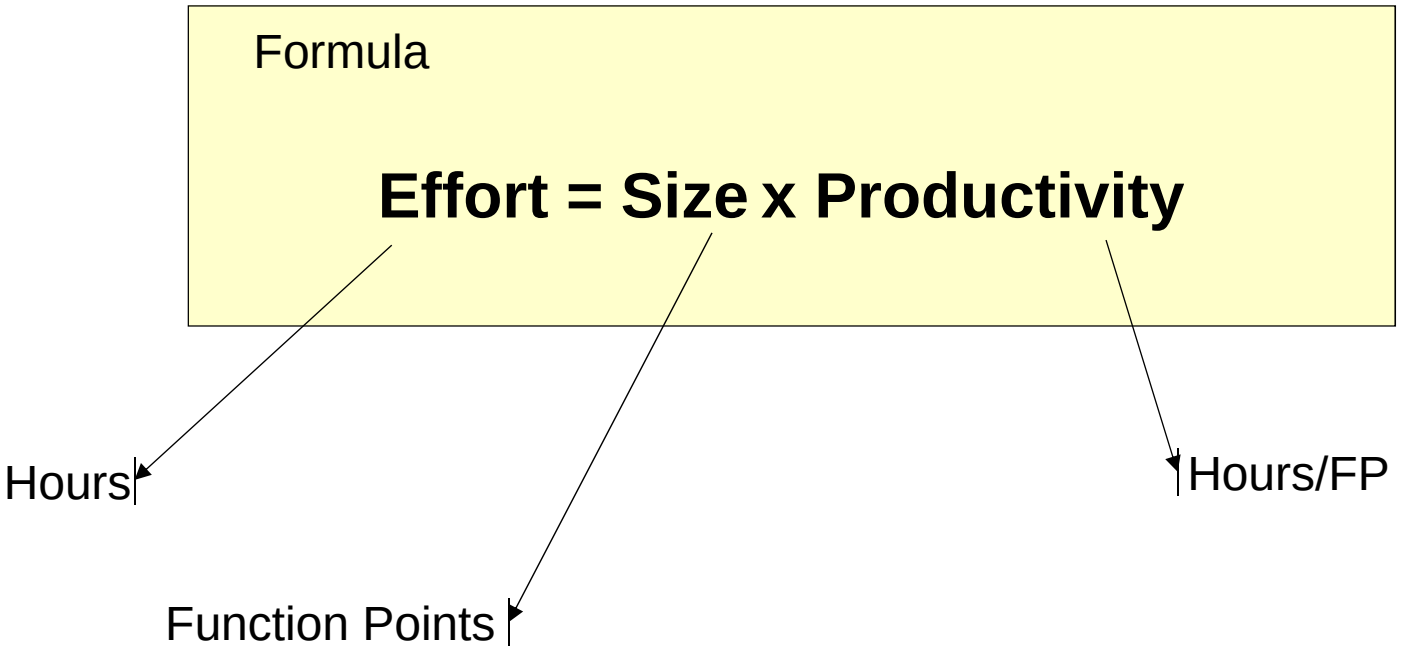
- Basic
  - Use FPs and a simple linear model to estimate effort
- Parametric
  - Use FPs as input to parametric models to estimate effort & schedule
    - COCOMO II, SEER, SLiM, etc.
- Other
  - Any method that uses size in FPs as input to estimation

FP-based Business Models
Estimation Models

- Estimation models are predictive models typically used in
  - Budgets
  - RFPs
  - Pricing model calibration

FP-based Business Models
Estimation Models

- Example: Basic



FP-based Business Models
Pricing Models

- Productivity-based model
  - **Productivity** measures the effort to develop a function point.

    Will vary with project characteristics:
    - Project size
    - Team experience
    - Team capability
    - Platform difficulty
    - Application complexity
    - etc.

FP-based Business Models
Pricing Models

- Productivity-based model
  - **Productivity** figures typically include all lifecycle phases
  - Typical **productivity** values: 5, 10, 15, 20 H/FP (hours per FP)

FP-based Business Models
Pricing Models

- Productivity-based model
  - **Productivity values** are typically established per project type based on historical data
    - Project types may be based on development platform
    - Productivity values may be client-defined or be part of a client-vendor agreement
    - Productivity values may be part of an RFP (as requirements)

FP-based Business Models
Pricing Models

- Productivity-based model
  - **Pricing**
    - **Effort** will be computed as
      - Size (FP) * Productivity (H/FP) = Effort (H)
    - **Price** will be computed as
      - Effort (H) * Hourly Rate ($)
    - Applies to both new development & enhancement projects

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
    - Size (FP) * Unit FP Price ($/FP)
  - For new development & enhancement projects

FP-based Business Models
Pricing Models

- Baseline-based model
  - A specific price per function point is established for an installed application base
  - A fixed monthly fee is charged for a service set (e.g., application maintenance/support)
  - Price is periodically updated with baseline growth
  - A Service Level Agreement handles details
  - Typically used for 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)
  - Typically used in contract penalties

FP-based Business Models
Other Models

- Negotiation-based model
  - Negotiation-intensive
  - Client obtains a baseline 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 typically based on historical data

Technical Considerations Related to the Use of Functional Sizing in Software Development Contracts

Technical Considerations
Predictive x Prescriptive Models

Estimation (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

Technical Considerations
Items Not Covered by Functional Sizing

- Existing Solutions
  - Define several different project types and assign them different productivities
  - Use a parametric model
  - Transform non-functional characteristics into “equivalent function points”
  - IFPUG SNAP(*)

(*) Potential solution - not currently in use

Technical Considerations
Sizing Enhancements

- Current Practice
  - Some Brazilian organizations find the IFPUG enhancement sizing method inaccurate for pricing models
  - They prefer to use the NESMA method instead
  - The NESMA method assigns different weights to added, deleted, and changed function points

Benefits and Challenges of Using Functional Sizing in Software Development Contracts

Benefits & Challenges
Benefits

- Improves current practice (‘better than before’)
- Drives productivity up
- Transparent
- Objective
- Good for any technology/process

Benefits & Challenges
Challenges

- Initial productivity determination (especially if no data is available)
- Non-functional items (FPs not applicable)
- Requirement interpretation may vary (fix poor requirements)
- Counting rules interpretation (certification helps)
- Keeping a win-win attitude (you can't always win!)

Summary

Summary
Things to Remember

- Business reasons for using FP-based models
  - Clients want to be in control
  - Result-oriented pricing puts client in control
  - FP-based pricing is result-oriented
- Reasons for success
  - Client in control
  - Potential productivity improvement
  - Potential cost reduction
  - Transparency
  - Objectivity
  - Standard-driven

Thank You!

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