I.T. Benchmarking using ISBSG database

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A Workshop prepared by the C.I.M.

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Workshop agenda...

- Context
- What is benchmarking?
- ISBSG, a tool for benchmarking
- Cases study
- Wrap-up
Context...

- Why benchmark?
- How does it get started?
- What is the result?
- Notes on credibility...
Why benchmark?

- Overall corporate pressure on I.T. ...
  - ... dissatisfaction with performance,
  - ... justify outsourcing decision,
- From a defensive perspective...
  - ... to justify that improvement is NOT an issue,
  - ... just enough to “get a number”,
- From newly appointed manager...
  - ... to justify increased investments,
  - ... to justify cutting cost,
- ...

CONTEXT
How does it get started?

- A guru gets hired from a reputable firm,
- Delivery carried out by hired staff,
- Whole approach based on the guru’s database,
- Internal coordinator appointed for data collection,
- Internal pressure for a quick turn-around of data collection across the board...
What is the result?

- Lots of numbers, graphs, nice slide presentation,
- Industry data often not verifiable,
- “Black box” approach,
- No data for root cause analysis,
- Bottom line: everybody sees what they want to see...
Notes on credibility...

- Consequences of fast data collection:
  - Impair credibility,
  - Data not consistent across teams and organization,
  - No quality control, no outliers analysis,
  - Not complete or internally consistent.

- Do not generate internal credibility,
- Poor external credibility,
- Lack of explanations for deviations from “industry averages”,
- No insider knowledge on “best performers”.
What is benchmarking?...

- Nature of benchmarking
- Economics of benchmarking
- Objects of benchmarking
- Types of benchmarking
- The 5 steps to success
- Managing expectations
- Summary
WHAT IS BENCHMARKING?

Nature of benchmarking...

« A continuous and systematic process for comparing ourselves with other units or organizations that represent excellence ».

- Impact on STRATEGY:
  - determination,
  - formulation,
  - implementation,
  - leadership development,
  - organization development and training

- Ability to define a direction for change and set achievable goals

STRIKE A BALANCE BETWEEN STABILITY AND RENEWAL
WHAT IS BENCHMARKING?

Economics of benchmarking

FREE MARKET: Customer strive to choose freely between alternative suppliers to optimize his value.

CAPTIVE MARKET: Push for supply rather than pull for demand

Benchmarking help equalize economic balance between supply and demand

BENCHMARKING PURPOSE:
Create or enhance economic value by supplying facts and information on what needs to be changed and what should remain intact.
Orient changes toward better performance; changes must produce credible, quantifiable improvements within a specified timeframe.
WHAT IS BENCHMARKING?

Objects of benchmarking

- Cost,
- Productivity,
- Time and speed,
- Quality and customer value.
WHAT IS BENCHMARKING?

Types of benchmarking

- Internal,
- External,
- Functional.
WHAT IS BENCHMARKING?

Types of benchmarking

INTERNAL BENCHMARKING

- Organizations can run benchmarking studies at their own pace,
- Enable organizations to learn how to use methods for learning and action,
- Access to internal information and data
- Action will focus on performance increases and, over time, equalization of performance differences across units

- CONTROL THEN IMPROVE
Types of benchmarking

EXTERNAL BENCHMARKING

- Against direct competitors,
- In same or distinct markets,
- With other countries.
WHAT IS BENCHMARKING?

Types of benchmarking

FUNCTIONAL BENCHMARKING

- Compare products, services and work processes with those of top organizations regardless of what business they are in.

- Basic idea: benchmark parts of the business that have similarities across industries.
WHAT IS BENCHMARKING?

The 5 steps to success

1. Select focus
2. Position
3. Exchange
4. Analyze
5. Take action
WHAT IS BENCHMARKING?

The 5 steps to success

1- SELECT FOCUS

- Decide WHAT to benchmark:
  - A matter of knowing your own business
  - Require a thorough understanding of factors influencing the performance of the benchmarking candidate

- Use of benchmarking for exploratory purposes
  - identify factors that are critical to performance
  - learn how to measure them
  - support level of resolution study
WHAT IS BENCHMARKING?

The 5 steps to success

2- POSITION

- Identify benchmarking partners
- Establish a relationship favoring the exchange of information
- Sequencing: internal, external and functional
- Explain project objectives
- Present project and action plan
- Supply to the potential partner the information needed to decide whether or not to cooperate
WHAT IS BENCHMARKING?

The 5 steps to success

3- EXCHANGE

- Information gathering

- Always start within your organization; it teaches a great deal from the viewpoint of what is to be benchmarked,
- Define and specify precisely the info. needed from the partners, it bear a direct impact on the quality of the data you will get!

- Points of ethics:
  - Treat all info. as CONFIDENTIAL,
  - Document all agreements,
  - NEVER ask for info. you are not prepared to release yourself.
WHAT IS BENCHMARKING?

The 5 steps to success

3- EXCHANGE

- Be well prepared, use multiple sources:
  - Questionnaires
  - Industry conferences
  - Video, phone, fax, e-mail, Web
  - Face to face interviews
  - Other publications
  - Group meetings
  - ...

WHAT IS BENCHMARKING?

The 5 steps to success

4- ANALYZE

- Sort and organize information by levels
- Control the quality of information
- Non-comparable factors:
  - differences in operative content
  - differences in scope of operations
  - differences in market conditions
- Identify performance gaps
- Report:
  - Describe to supply enough context
  - Recommend in business terms:
    - Make or Buy Analysis
    - Improve
    - Integrate
    - Sell-off
WHAT IS BENCHMARKING?

The 5 steps to success

5- TAKE ACTION

- This is where the benefits kicks in!
- Close identified gaps
- Thoroughly plan the changes
- Integrate changes with business plans
- Implement AND TRACK IMPACT!
WHAT IS BENCHMARKING?

Managing expectations

- What does the SEI maturity model mean?
- Where are you on the SEI model?
- Based on your status, what could realistically be expected?
- What will be the quality of YOUR data?
- What will be the quality of your PARTNERS process and data?
- Your EXPECTATIONS should match your maturity status and incremental progress path.
WHAT IS BENCHMARKING?

Summary

1. Select focus
2. Position
3. Exchange
4. Analyze
5. Take action
WHAT IS BENCHMARKING?

Summary

- The 6 conditions of BenchLEARNING:
  - have the will and courage to gain insights;
  - find out what is known about the subject, and by whom;
  - acquire info. and absorb knowledge;
  - internalize and pool experience to cement knowledge;
  - codify successful behavior and change work process accordingly;
  - training: apply knowledge, develop proficiency.
Break time!
ISBSG, a tool for benchmarking...

- Brief history of ISBSG
- ISBSG data collection tools and procedure
- Overview of ISBSG Benchmark report (r.5)
ISBSG, A TOOL FOR BENCHMARKING

Brief history of ISBSG

Where does it fits in?

1. Select focus
2. Position
3. Exchange
4. Analyze
5. Take action
ISBSG, A TOOL FOR BENCHMARKING

Brief history of ISBSG

- **MOTIVATION:**
  Practitioners who wanted **CONTROL** and sought the **BEST PRACTICES**

- Members of ASMA (1991)

- Establish a database of IT projects productivity

- 1st release contained 24 projects (1992)

- Revised procedure and collection package twice

- Supplied 5 more release up to June 1994
Brief history of ISBSG

- ASMA approached by UK AND USA

- Established International Software Benchmarking Standards Group (ISBSG) in 1994
  - Develop *de facto* international standards
  - Share collected data

  - Australia
  - Canada
  - Germany
  - Italy
  - Netherlands
  - United Kingdom
  - USA
ISBSG, A TOOL FOR BENCHMARKING

ISBSG tools and procedure

- Submit a project and get it benchmarked against similar projects (free!)
- Use a data collection software called VENTURI, available on the Web (http://www.isbsg.org.au/idwnload.htm)
- Export a data file, send over by e-mail
- Receive a benchmarking report by fax or e-mail
ISBSG, A TOOL FOR Benchmarking

ISBSG tools and procedure

- The VENTURI software
ISBSG, A TOOL FOR BENCHMARKING

ISBSG benchmark report

- Australia: 395 projects
- Canada: 14 countries
- USA: 395 projects
- UK: 14 countries
- Netherlands: 395 projects
- Norway: 14 countries
- India: 395 projects
- New Zealand: 14 countries
- Hong-Kong: 395 projects
- Germany: 14 countries
- Poland: 395 projects
- Austria: 14 countries
- Japan: 395 projects
- Denmark: 14 countries

Release 4
- 395 projects
- 14 countries
ISBSG benchmark report

Projects aging profile
ISBSG benchmark report

Types of contributing organizations

- Public administration: 18%
- Finance, Property, Business services: 15%
- Banking: 14%
- Utility: 10%
- Manufacturing: 13%
- Others: 30%
ISBSG benchmark report

Application types

- MIS: 42%
- TXN/Production: 32%
- Office information systems: 12%
- Others: 14%
ISBSG benchmark report

Project types

- New development: 65%
- Enhancements: 30%
- R & D: 5%
ISBSG, A TOOL FOR BENCHMARKING

ISBSG benchmark report

Development platform

- Mainframe: 67%
- Mid-range: 19%
- PC: 13%
- Unspecified: 1%
Development languages

- COBOL
- NATURAL
- PL/1
- TELON
- SQL
- C
- ACCESS
- ORACLE
- POWERBUILDER
- EASYTRIEVE
- Unspecified

ISBSG benchmark report

ISBSG, A TOOL FOR BENCHMARKING
CASE tools usage

No CASE tools
40%

Unspecified
20%

CASE tools used
40%

Upper CASE
41%

Lower CASE
25%

Integrated
9%

Unspecified
25%
ISBSG, A TOOL FOR BENCHMARKING

ISBSG benchmark report

Methodologies usage

- In-house: 25%
- Customized commercial: 19%
- Commercial: 14%
- Not specified: 25%
- No methodology: 17%
Break time!
Cases study...

- Context
- Schedule benchmarking
- Effort benchmarking
- Performance analysis
CASES STUDY

Context...

- Subset of 201 projects,
- Subset of 12 variables,
- All product size measured using IFPUG Function Points,
- All project effort include direct S.E. labor only.
Description of variables

- **PID**: project unique identifier,
- **REG**: world region where product was developed (N-A, ASI, EUR),
- **YEAR**: Last two digits of the year product has been put in production,
- **LGEN**: Technological generation of programming language used (3GL, 4GL, ApG),
- **MET**: Type of S.E. methodology used (No, Yes, Prch, Comb, Inhs),
- **CASE**: Type of S.E. CASE tool used (No, Yes, Lowr, Uppr, Intg),
Description of variables

- **DUR**: project duration (elapsed months),
- **MAXR**: maximum number of individuals assigned to the project,
- **EFF**: project effort (person-hours),
- **SIZE**: resulting software product size (function points),
- **DTYPE**: Type of project (ND, EN),
- **PLAT**: Development platform used (MF, MR, PC).
A shared a priori process model

Context...

Requirements → SIZE → EFFORT → DURATION

- LGEN
- MET
- CASE
- PLAT
- MAXR
- DTYPE
Schedule benchmarking

**TASK:** Establish a **general quantitative** relationship between direct S.E. **effort** and overall project **schedule**.

**PROPOSED APPROACH**

- Study each variable separately,
- Know the limitations of statistical tools,
- Appreciate the hypothesized relationship,
- Quantify the relationship,
- Establish model limitations.
Schedule benchmarking

Effort sample behavior

<table>
<thead>
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<th>Effort classes</th>
<th>Frequency</th>
</tr>
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<tbody>
<tr>
<td>11000</td>
<td>0</td>
</tr>
<tr>
<td>22000</td>
<td>200</td>
</tr>
<tr>
<td>33000</td>
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<td>88000</td>
<td>80</td>
</tr>
<tr>
<td>99000</td>
<td>60</td>
</tr>
<tr>
<td>ou plus...</td>
<td>40</td>
</tr>
</tbody>
</table>
Schedule benchmarking

Duration sample behavior

Duration classes

Frequency

0 20 40 60 80 100 120 140

9 17 25 33 41 49 57 65 73 ou plus...
Schedule benchmarking

A Limitation of regression analysis:

Data follow a normal distribution (!)
Schedule benchmarking

Applying a Log transform to the variables:
Schedule benchmarking

Appreciation of the relationship

\[ r = 0.63 \]
Schedule benchmarking

Quantifying the relationship

\[ \log(D_m) = 0.36\log(E_{ph}) - 0.30 \]
Schedule benchmarking

First cut

\[ D_m = E_{ph}^{0.36} + 0.5 \]
Schedule benchmarking

Model limitations

- Identify outliers
- Verify regression hypotheses
- Apply confidence intervals
- Determine acceptable input range
- Measure model performance
Effort benchmarking

Exercise:
- Produce two simple effort benchmarking models using
  - Software product size as the model input
  - First model: for product developed with 3GL
  - Second model: for product developed with 4GL
- Compare the two models; do they differ significantly?
Performance analysis

How do we stand process wise?

- Critical business elements:
  - cost (strive for the lowest),
  - duration (strive for the shortest),
  - quality (strive for the highest).
- We will use two of them
  - cost and duration
- Remove effect of currency
  - effort used as a “proxy” of cost
Performance analysis

How do we stand process wise?

- Remove effect of size
  - use unit effort (ph/FP)
  - use schedule delivery rate (FP/m)

- Ranking:
  - worst 25%
  - middle 50%
  - best 25%
Performance analysis

Ranking projects unit effort

Best 25% : 0.01 - 4.00 hp/FP
Middle 50% : 4.01 - 13.00 ph/FP
Worst 25% : 13.01 and more ph/FP
Performance analysis

Ranking projects schedule delivery rate

Worst 25%: 0.01 - 19.50 FP/m
Middle 50%: 19.51 - 74.00 FP/m
Best 25%: 74.01 and more FP/m
Performance analysis

Combining both

Where is YOUR project?
Wrap-up...

- The 6 conditions of BenchLEARNING:
  - have the will and courage to gain insights,
  - find out what is known about the subject, and by whom,
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