

INTRODUCTION TO SOFTWARE ANALYTICS

Basics of software analytics and
case study of Amisoft

CONTENTS

- ◉ What is software analytics?
- ◉ Survey
- ◉ Case study : Amisoft

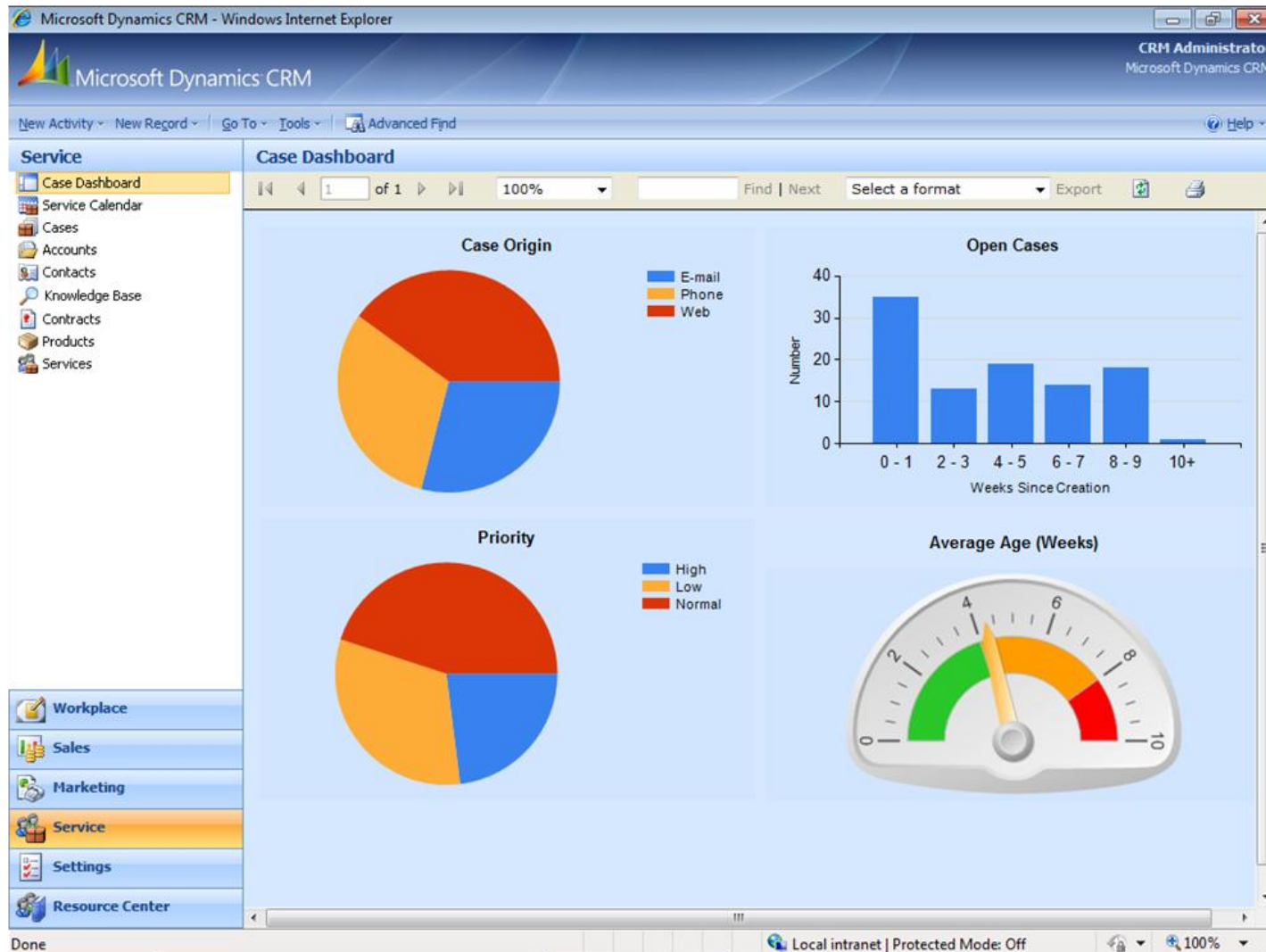
DOUBT

- ◉ Analytics
- ◉ Data Analysis
- ◉ Software Analytics
- ◉ Software Analytics = Data Analytics?

WHAT IS ANALYTICS?

- ⦿ **Analytics** is the discovery and communication of meaningful patterns in data.
- ⦿ Especially valuable in areas rich with recorded information, analytics relies on the simultaneous application of **statistics**, **computer programming** and **operations research** to quantify performance.
- ⦿ Analytics often favors **data visualization** to communicate insight

DATA VISUALIZATION



DATA ANALYTICS

- ◉ **Analysis of data** is a process of inspecting, cleaning, transforming, and modeling data with the goal of discovering useful information, suggesting conclusions, and supporting decision making.
- ◉ Data mining is a particular data analysis technique that focuses on modeling and knowledge discovery for predictive rather than purely descriptive purposes.
- ◉ Business Analytics...

DEFINITION

Software Analytics^[1] is to utilize the data-driven approach to enable software practitioners to perform data exploration and analysis in order to obtain insightful and actionable information for completing various tasks around software systems, software users, and software development process.

PREVIOUS DOUBTS

- ◉ Analytics is a multi-dimensional discipline. There is extensive use of mathematics and statistics, the use of descriptive techniques and predictive models to gain valuable knowledge from data - data analysis.
- ◉ So, we can think of software analytics as “big data” for software development.

QUESTIONS ANSWERABLE

- ⦿ Using past data to analyze future projects.
- ⦿ Using defect data to allocate effort in a running project
- ⦿ Analyzing code to look for patterns or anti patterns
- ⦿ And many more...

DIFFERENT KINDS OF SOFTWARE ANALYTICS

- ◉ Internal versus External.
- ◉ Quantitative versus qualitative.
- ◉ Practitioner audience versus Management audience.
- ◉ Data mining tools versus interactive tools.

MICROSOFT ANALYTICS SYSTEMS

- ◉ **Codemine** is a software development data analytics platform for collecting and analyzing engineering process data. It includes constraints and pivotal organizational and technical choices.
- ◉ **StackMine** was developed to perform software analytics on a particular set of data **PerfTrack**, which logs reports of poor end performance.

Still internet explorer is not responding! Huh!

WHY SOFTWARE ANALYTICS?

- ◉ Small business
- ◉ Middle level enterprise
- ◉ Large enterprise

Make DECISIONS !! faster?

A SMALL SURVEY

Software development survey

Your honest answers will help the software industry to grow in a positive way

* Required

Choose your current position *

- ☐ Student
- ☐ Employee

Since how long you are Coding? *

- ☐ 1-3 years
- ☐ 3-5 years
- ☐ 5 years and above

Industry coding experience? *

- ☐ No industry experience
- ☐ 1-3 years
- ☐ 3-5 years
- ☐ 5 years and above

Do you like documenting before coding *

- ☐ Yes, it helps me to make my code better
- ☐ No, it is a waste of time.

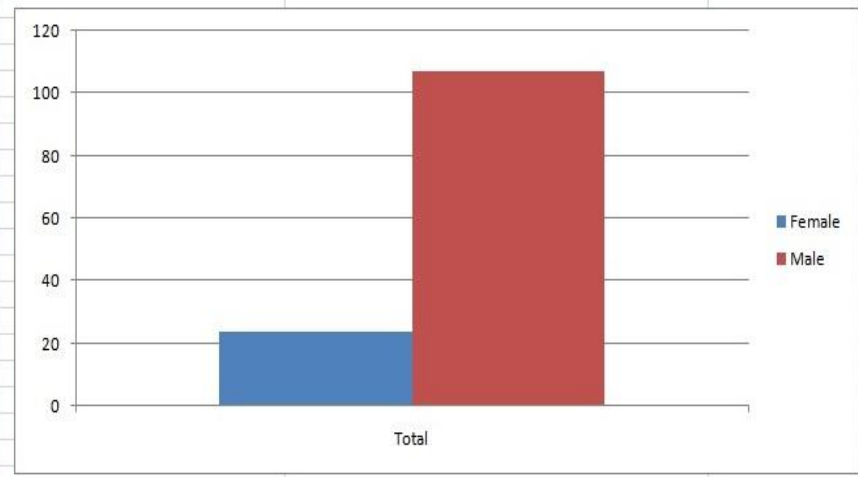
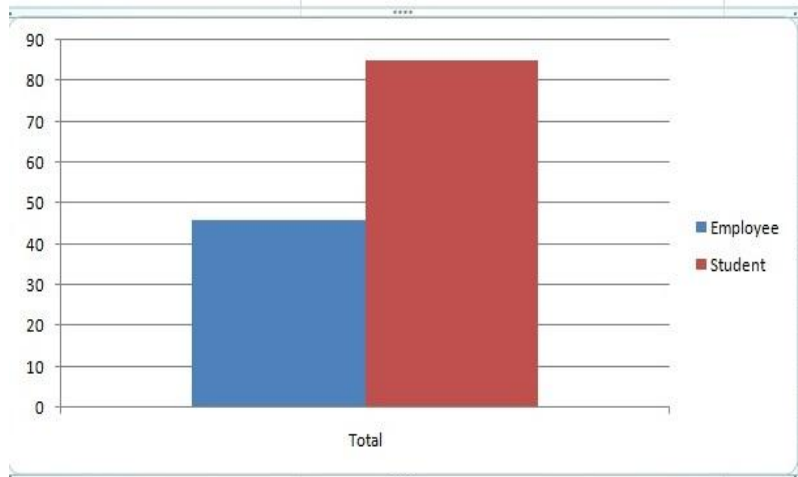
Your Sex ? *

- ☐ Female
- ☐ Male

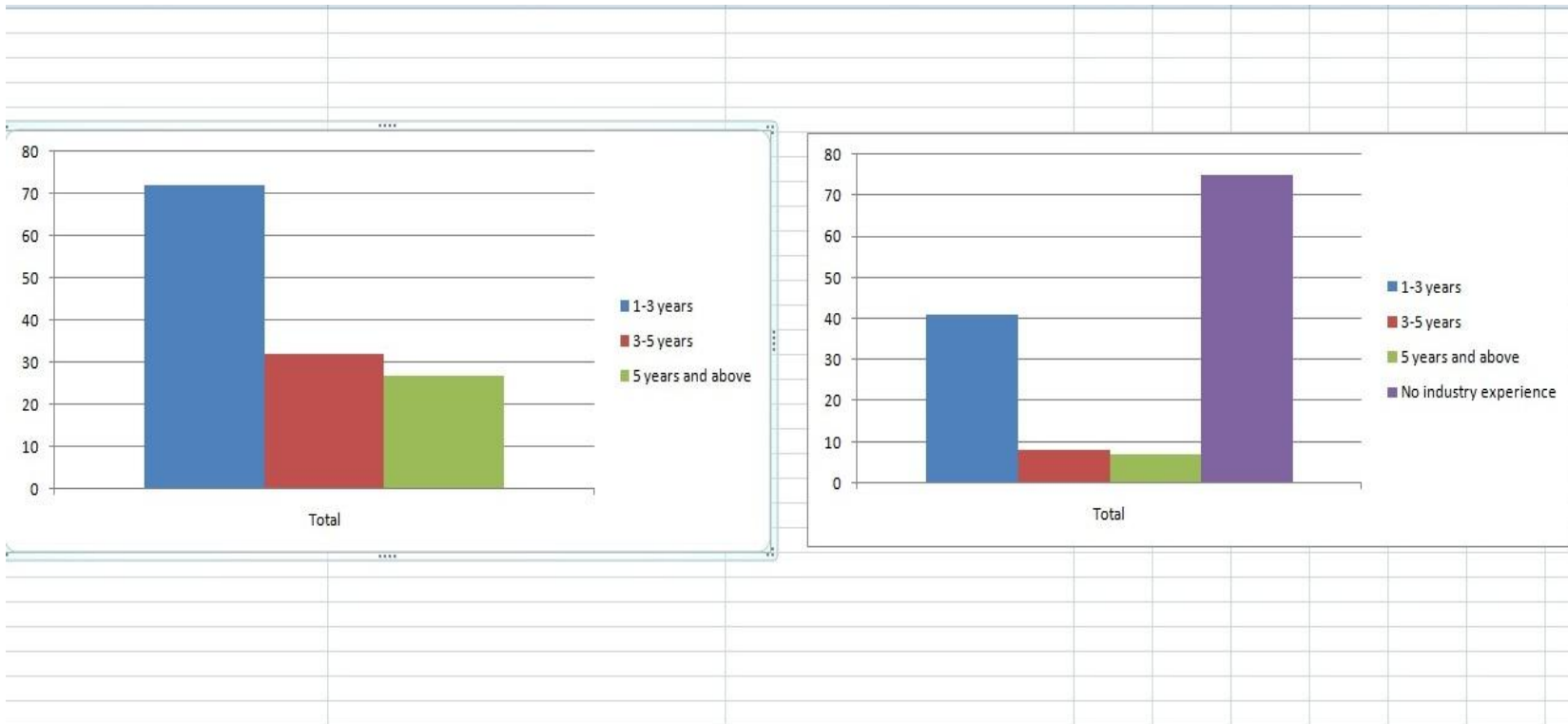
Submit

Never submit passwords through Google Forms.

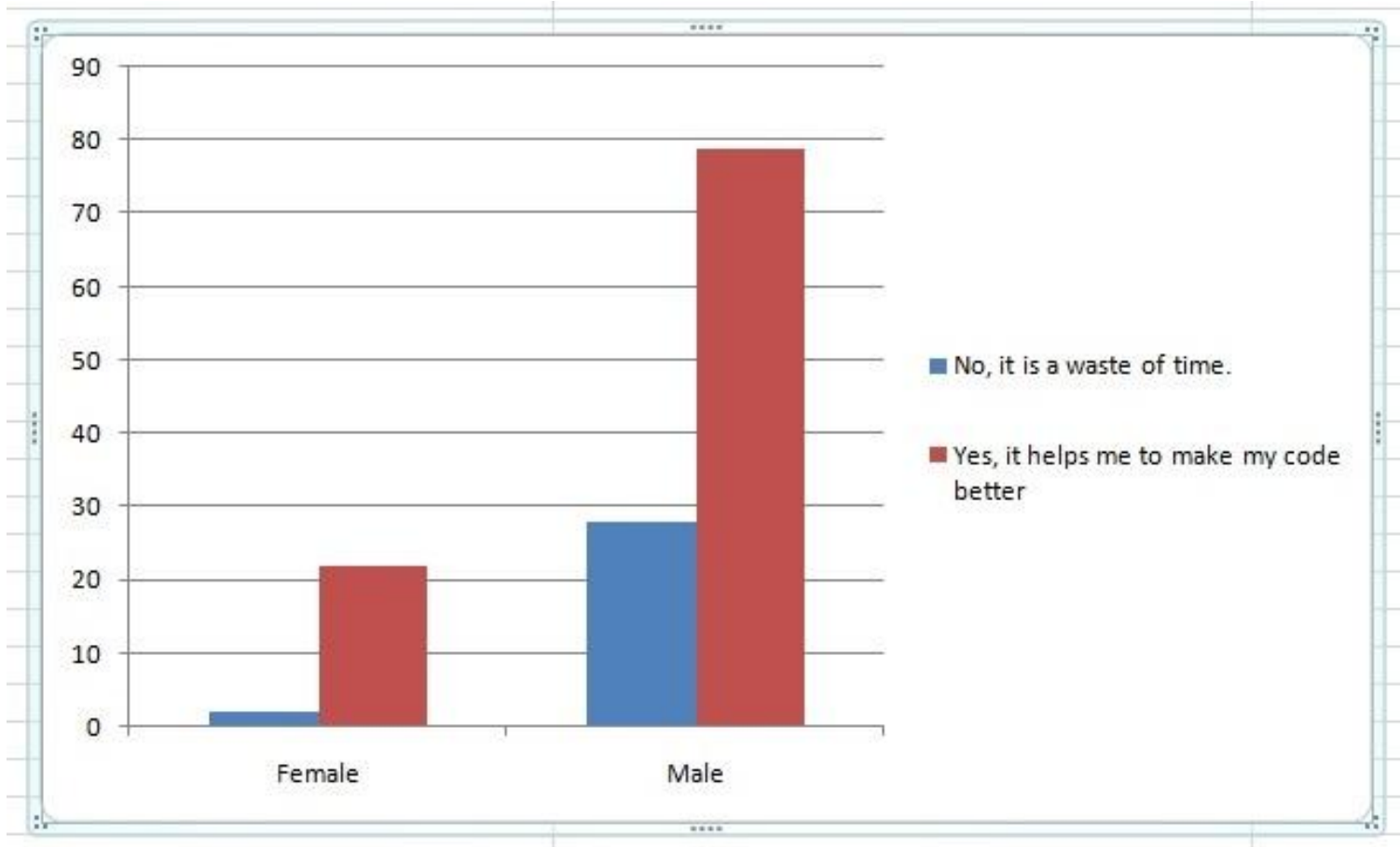
DATA



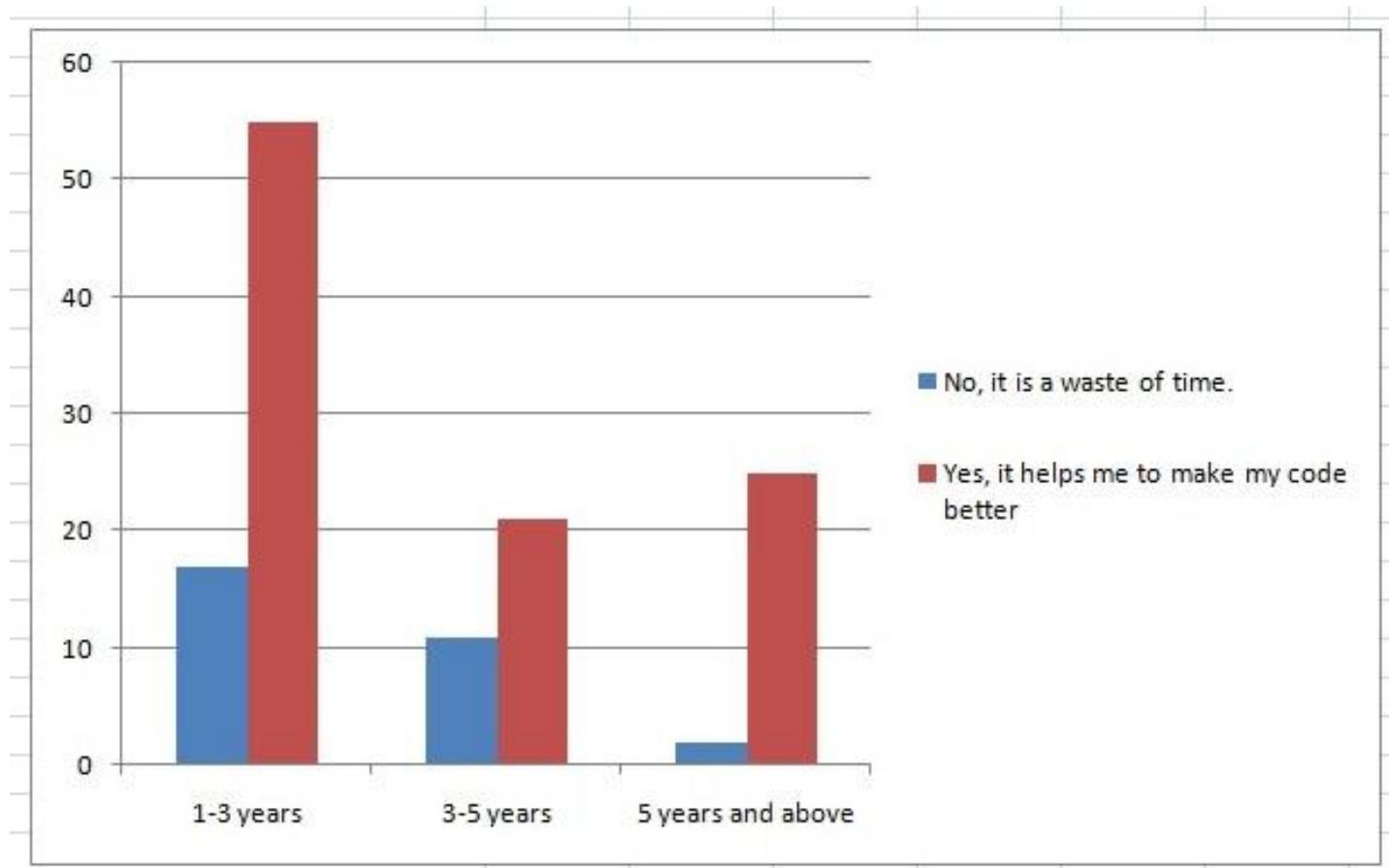
DATA...



INFERENCE



INFERENCE...



CASE STUDY : AMISOFT

WHAT IS AMISOFT?

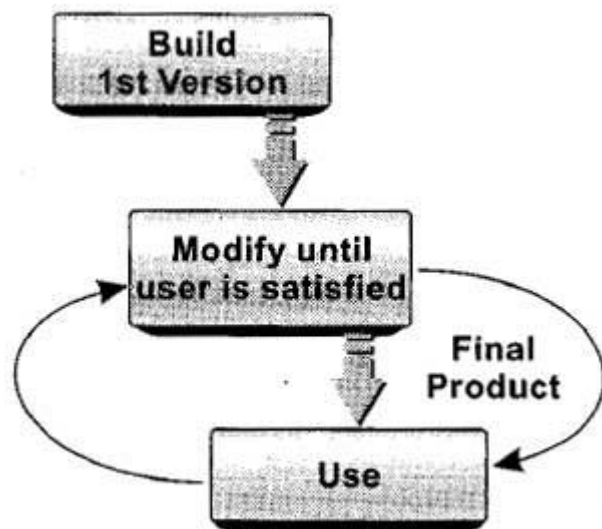
- ◉ 15 year old Chilean software company.
- ◉ 43 employees.
- ◉ Services based company.
- ◉ Different roles by same employee.

WHY SOFTWARE ANALYTICS WAS BROUGHT IN AMISOFT

HOW SERVICES COMPANY WORK

- ◉ Check a project
- ◉ Make Proposal
- ◉ Send Proposal
- ◉ Win JOB
- ◉ Complete JOB un till customer is satisfied.

SOFTWARE DEVELOPMENT MODEL



Code and fix model



Rational unified process

SOFTWARE ANALYTICS AT AMISOFT

Data sources

- ◉ Time sheets
- ◉ The artifacts
- ◉ Requirements
- ◉ Functional tests
- ◉ Client satisfaction
- ◉ Employee data

SOFTWARE ANALYTICS AT AMISOFT...

Metrices

Earned value management.

- ⦿ Planned Value(PV)
- ⦿ Earned Value(EV)
- ⦿ Actual cost(AC)
- ⦿ Cost performance Index = EV/AC over cost or under cost
- ⦿ Schedule performance Index= EV/PV over schedule
under schedule

SOFTWARE ANALYTICS AT AMISOFT...

Additional metrics

- ◉ Requirement volatility
- ◉ Process and schedule adherence
- ◉ Functional test
- ◉ Software events
- ◉ Human resources

SOFTWARE ANALYTICS AT AMISOFT...

Metrics NOT collected

- ◉ Version control systems
- ◉ Bug tracking system

Extra cost is JUSTIFIED!!!!

SOFTWARE ANALYTICS AT AMISOFT...

Data collection

- ◉ Employees
- ◉ Project managers
- ◉ The data analyst

I hope I'll bag a JOB 😊

BENEFITS OF SOFTWARE ANALYTICS AT AMISOFT

Strategic decisions

- ⦿ Requirement volatility
- ⦿ Scheduling
- ⦿ Verification and validation

BENEFITS OF SOFTWARE ANALYTICS AT AMISOFT...

Tactical decisions

- ◉ Personal
- ◉ Client interaction
- ◉ Rescheduling

COST OF SOFTWARE ANALYTICS AT AMISOFT

- ◉ Initial cost
- ◉ Running cost
- ◉ Resistance

LESSONS LEARNED

- ◉ Software analytics are worthwhile, if you follow a process
- ◉ Data analysis practices lack maturity
- ◉ Small companies have different analytics needs

CONCLUSION

- ◉ It is a process of extracting meaningful insights from the data produced during software development and operation.
- ◉ It depends on the type, size and functionality of the company.
- ◉ It may have high initial cost, an average operational cost but it enhances in software development and contributes a significant figure in profit.

REFERENCES

- ◎ Dongmei Zhang, Yingnong Dang, Jian-Guang Lou, Shi Han, Haidong Zhang, and Tao Xie. "Software Analytics as a Learning Case in Practice: Approaches and Experiences". In Proceedings of International Workshop on Machine Learning Technologies in Software Engineering (MALETS 2011), Lawrence, Kansas, November 2011
- ◎ "Are Software Analytics Efforts Worthwhile for Small Companies? The Case of Amisoft", Romain Robbes, Rene Vidal, Maria Cecilia Bastarrica, IEEE Software, September/October 2013
- ◎ www.google.com
- ◎ www.wikipedia.org

QUESTIONS

THANK YOU... 😊