

Technical Debt: Some Findings and a Standard

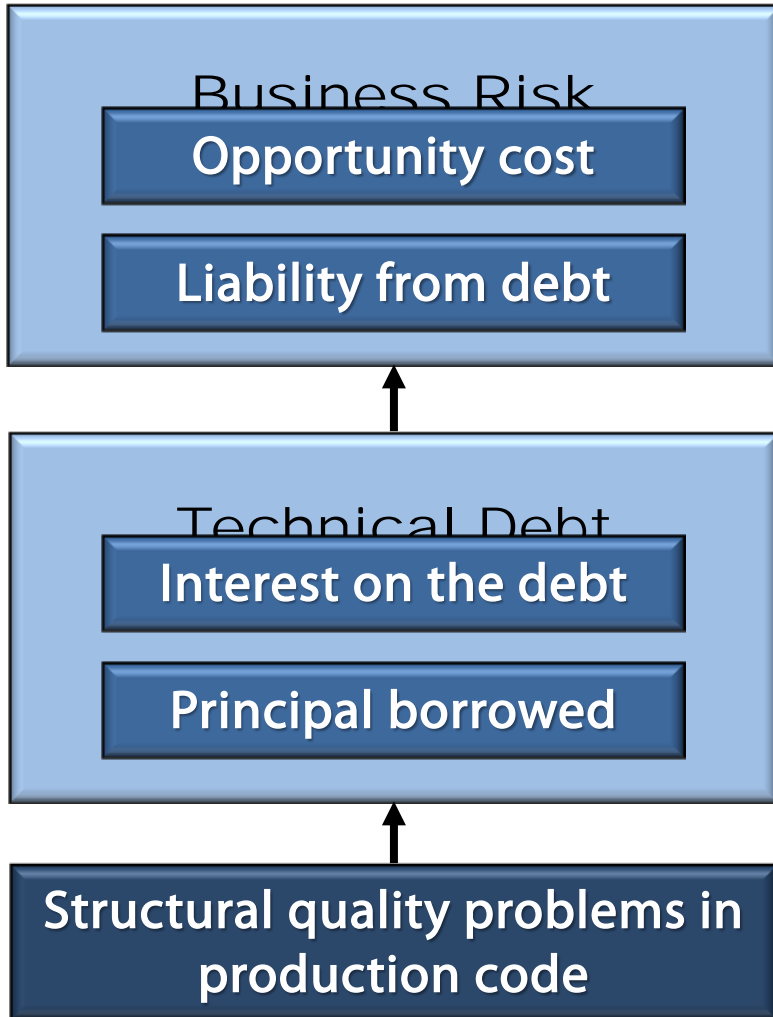
Dr. Bill Curtis, Executive Director
Cyber Resilience Summit June 6, 2017

CISQ

Consortium for IT Software Quality



Technical Debt — the future cost of defects remaining in code at release, a component of the cost of ownership



Opportunity cost—benefits that could have been achieved had resources been put on new capability rather than retiring technical debt

Liability—business costs related to outages, breaches, corrupted data, etc.

Interest—continuing IT costs attributable to the violations causing technical debt, i.e, higher maintenance costs, greater resource usage, etc.

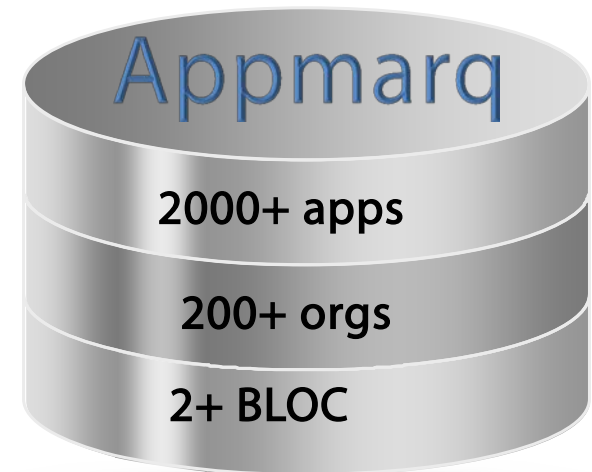
Principal—cost of fixing problems remaining in the code after release that must be remediated

Application Characteristics

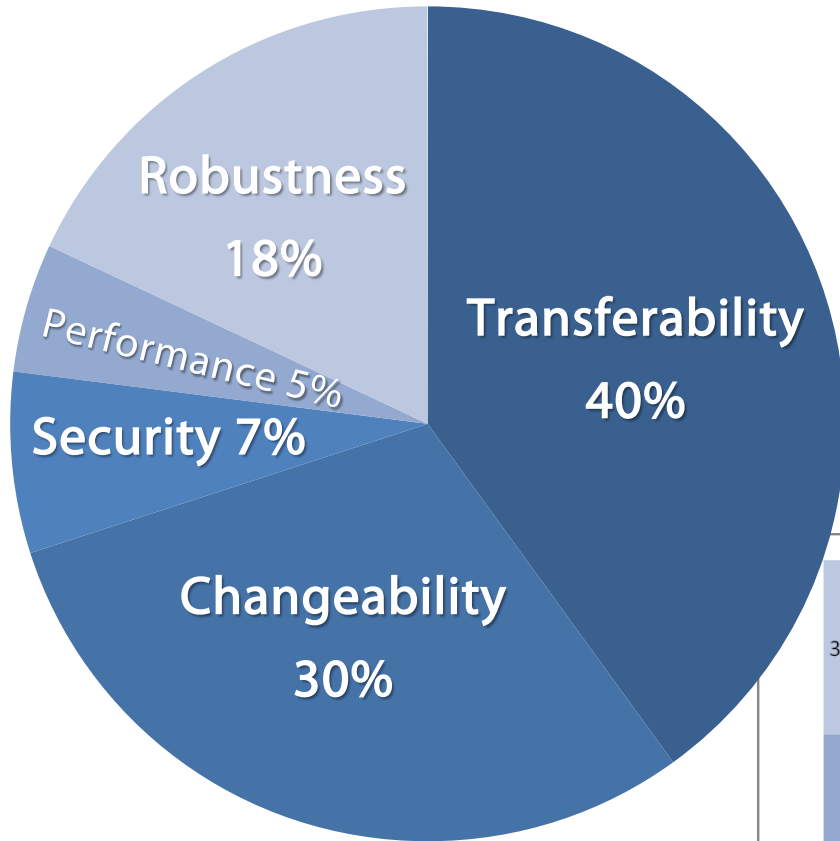
- **Robustness** — stability, resilience, and recovery from operational interruptions
- **Performance** — responsiveness and efficient use of resources
- **Security** — ability to prevent unauthorized intrusions
- **Transferability** — understandability of an application by other teams
- **Changeability** — ease of modifying source code
- **Total Quality Index** — aggregate score of the 5 quality characteristics above
- **Size** — lines of code, Automated Function Points

Demographic Characteristics

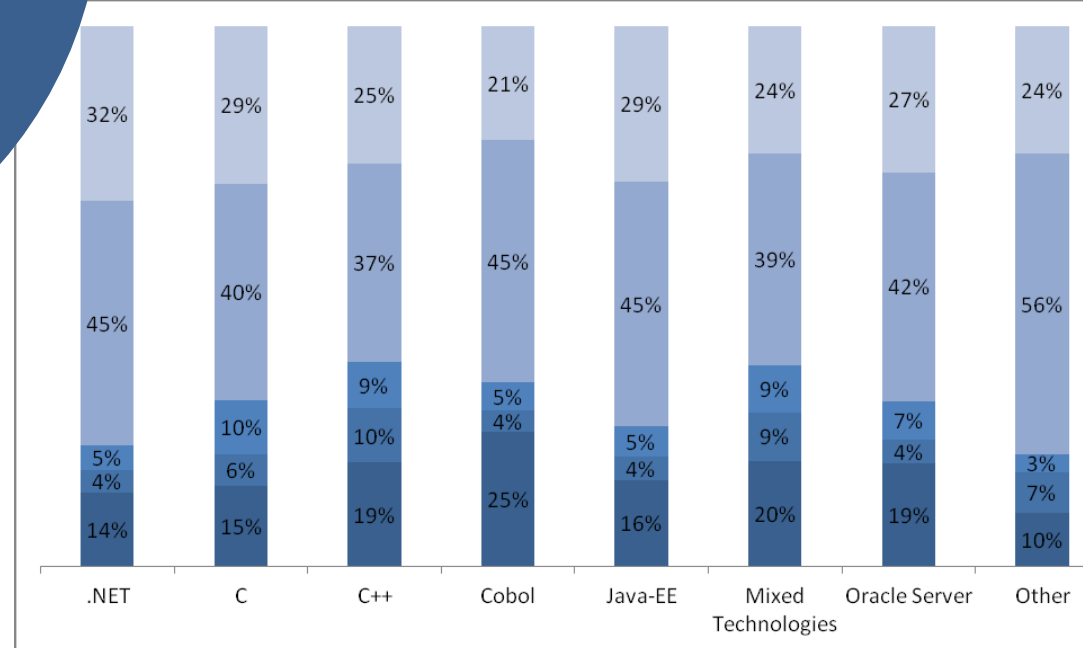
- **Language/Technology**
- **Industry Sector**
- **Source and Shore**
- **CMMI Level**
- **Development Method**
- **Age & Team size**



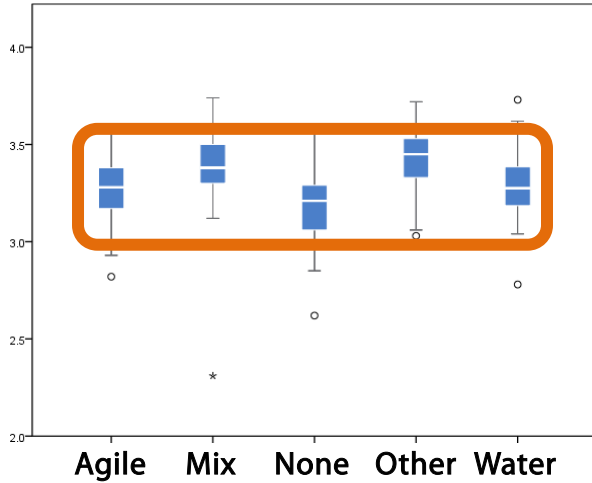
Technical Debt by Quality Characteristic



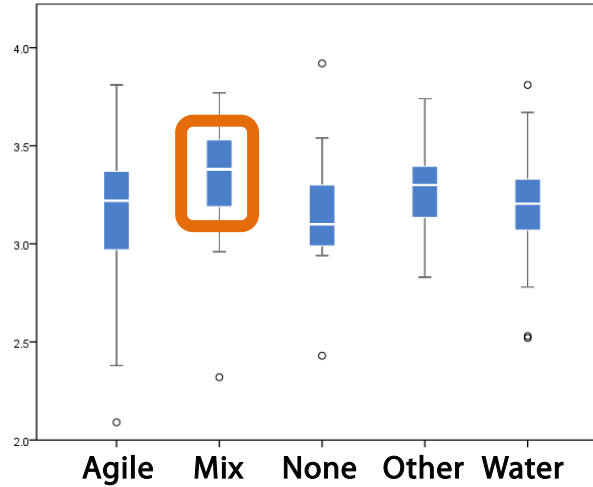
- **70% of Technical Debt is in IT Cost (Transferability, Changeability)**
- **30% of Technical Debt is in Business Risk (Robustness, Performance, Security)**
- **Health Factor proportions are mostly consistent across technologies**



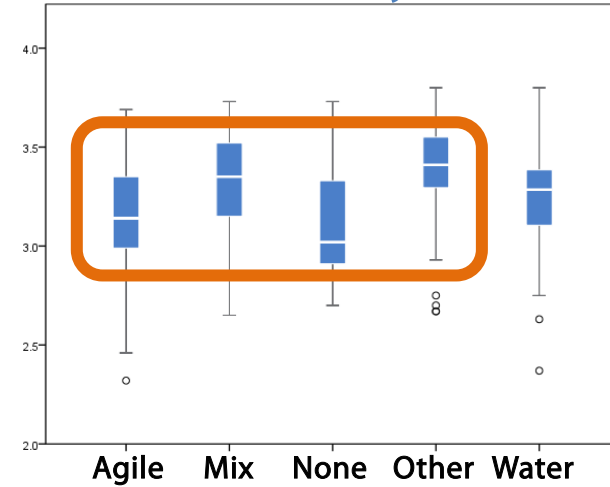
Robustness



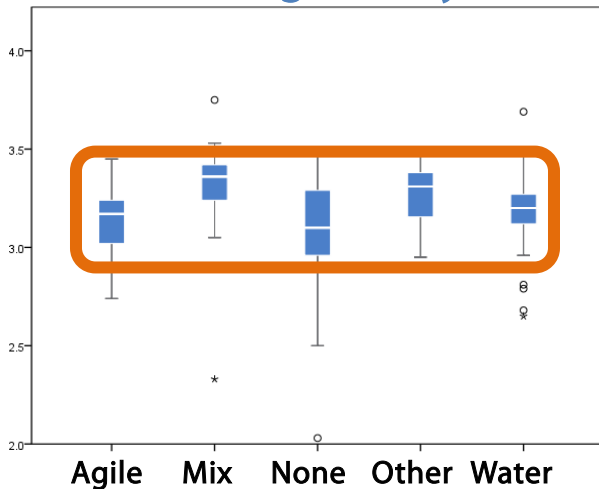
Performance



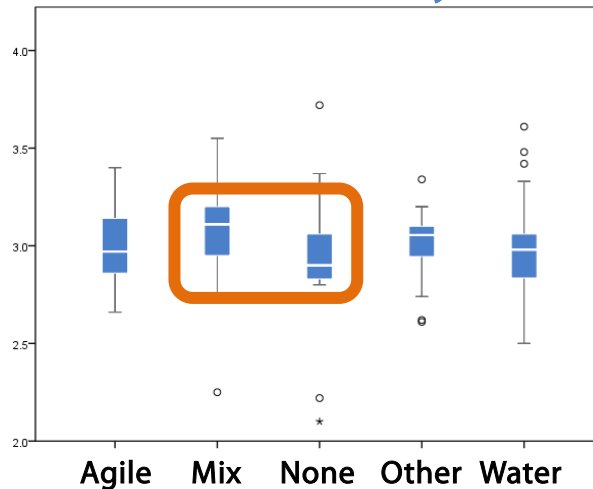
Security



Changeability



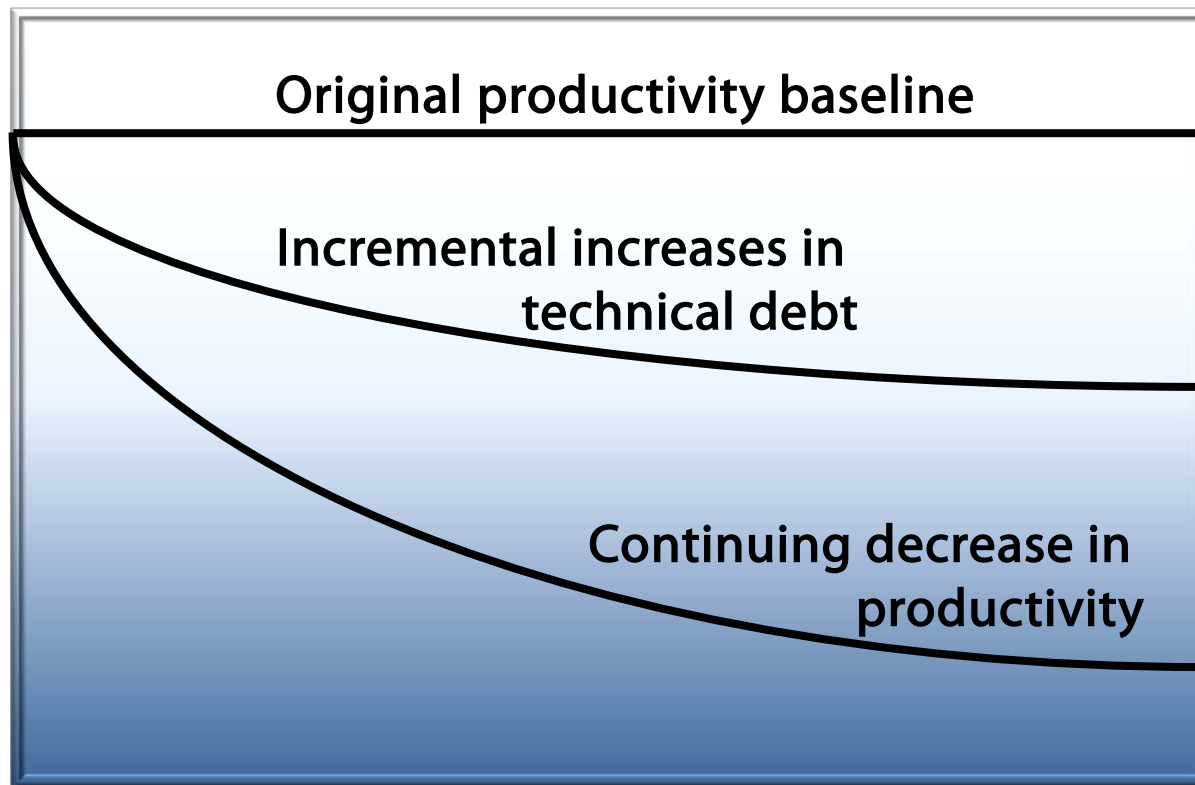
Transferability



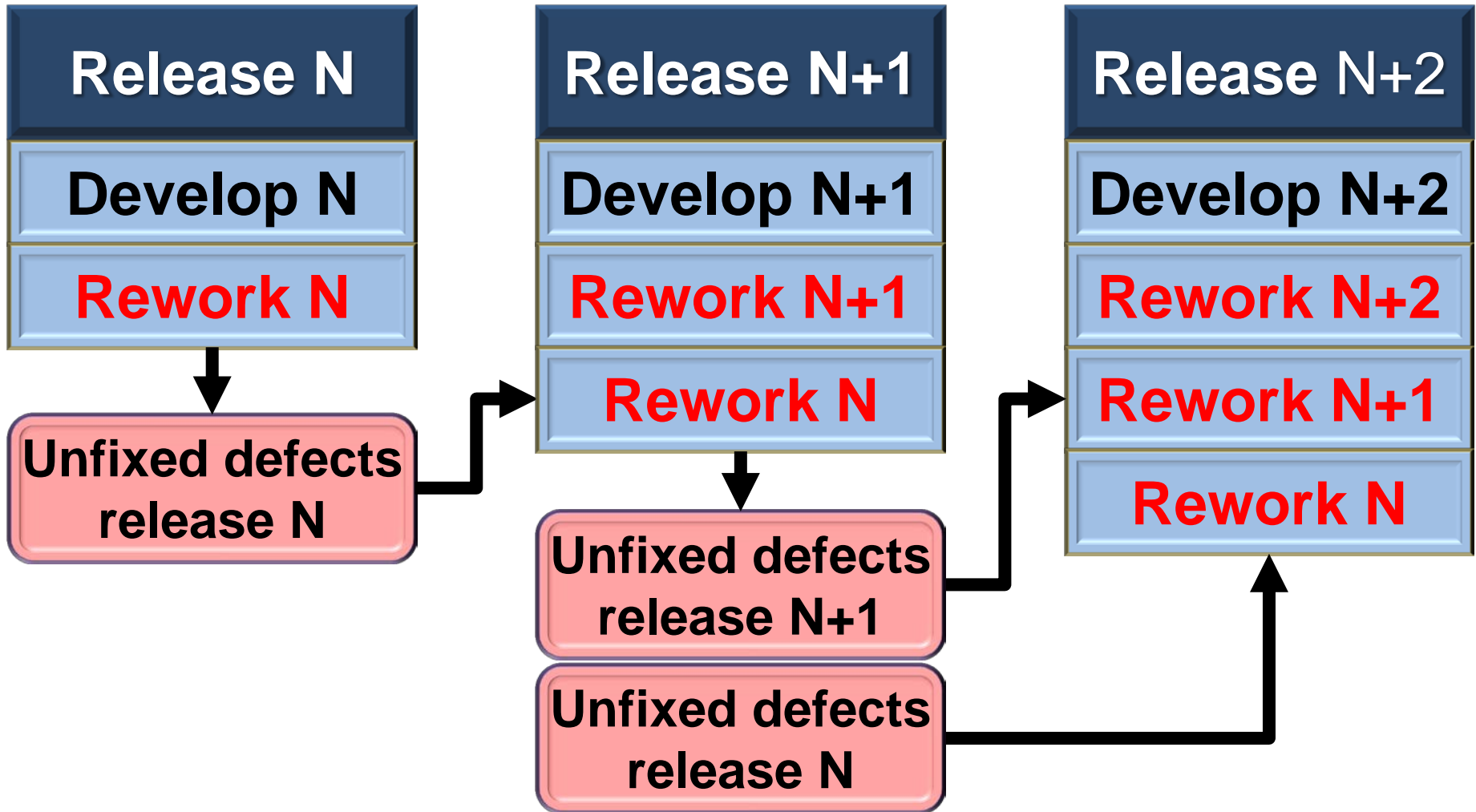
Agile $n = 57$
 Hybrid $n = 46$
 No method $n = 21$
 Other $n = 36$
 Waterfall $n = 60$
All F-tests significant
 $df = 4, 215; p \leq .02$

Assumption: Productivity is a stable number

Reality: Productivity is a monotonically decreasing function of releases



Unless you take action !!!

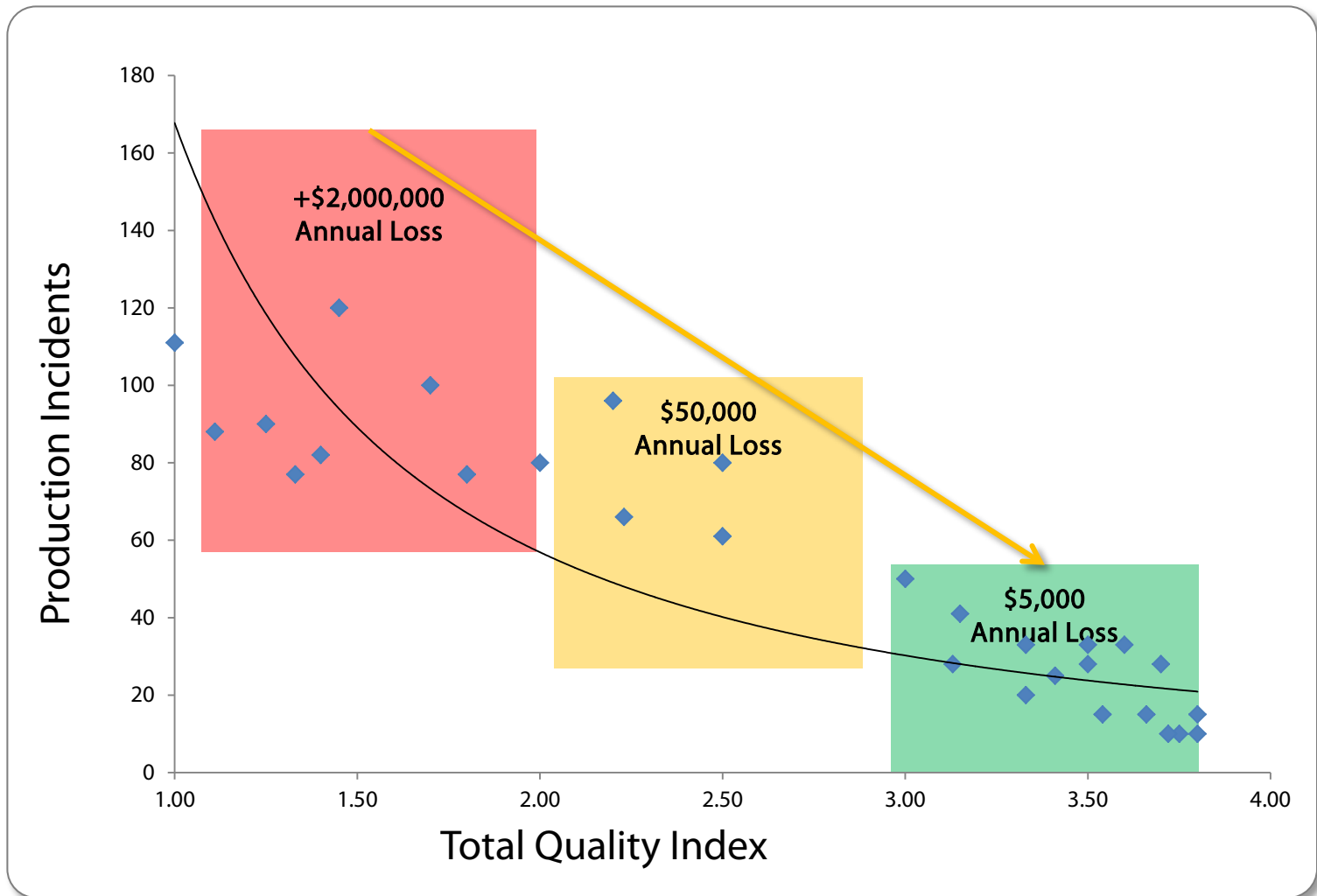


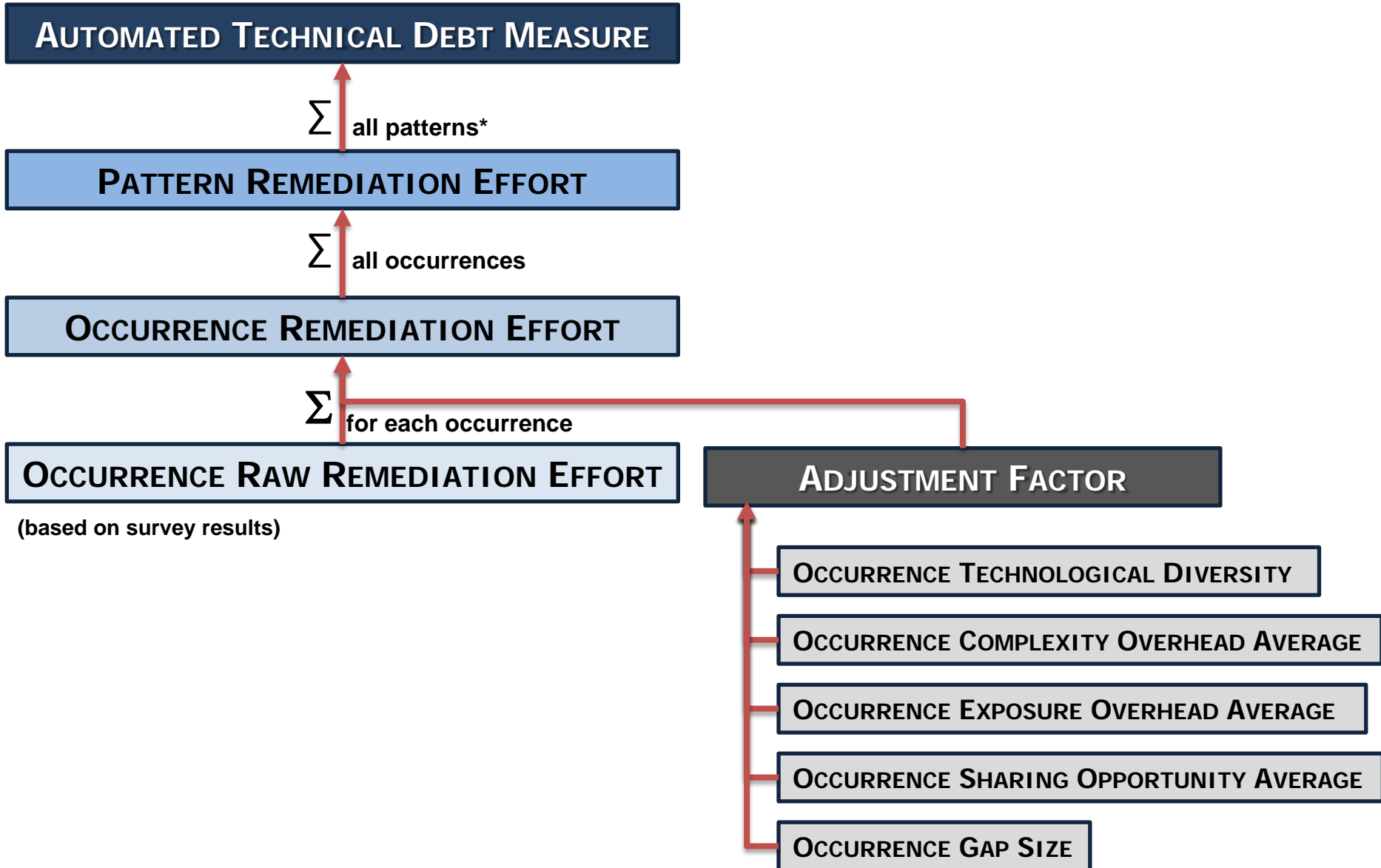
No Function Point credit for rework

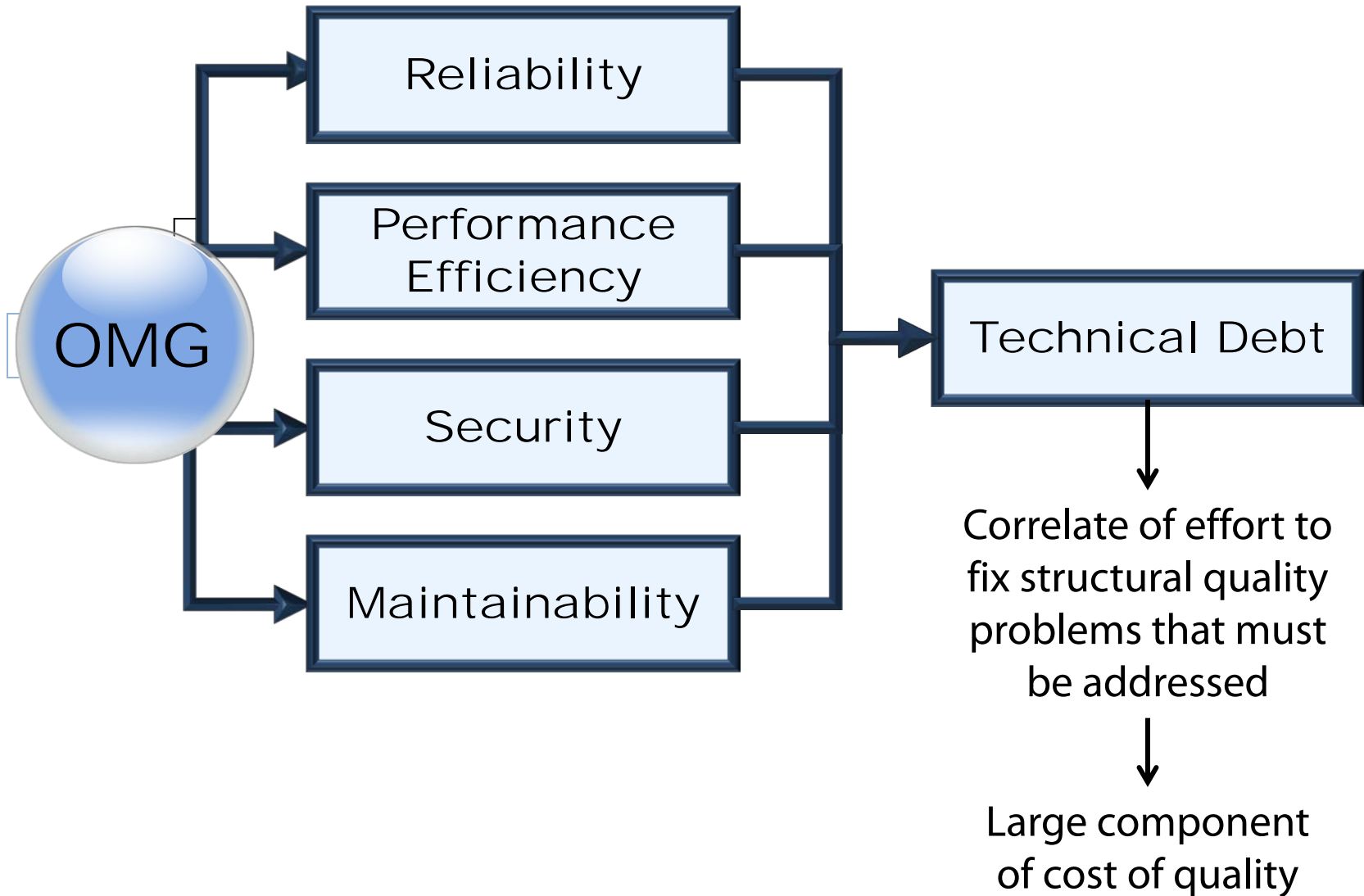


Charge rework effort against the release where defect was injected

Large international investment bank







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The Consortium for IT Software Quality (CISQ) is an IT industry leadership group comprised of IT executives from the Global 2000, system integrators, outsourced service providers, and software technology vendors committed to introducing a computable metrics standard for measuring software quality & size. CISQ is a neutral, open forum in which customers and suppliers of IT application software can develop an industry-wide agenda of actions for improving IT application quality to reduce cost and risk.



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CISQ specifies how to measure four quality characteristics and Automated Function Points – both at the unit level and the whole system level.

ANY ORGANIZATION CAN MEASURE THEMSELVES AGAINST CISQ SPECIFICATIONS.

FIND OUT HOW »

	System Level	Unit Level		
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<div style="border: 1px solid #0070C0; border-radius: 50%; width: 30px; height: 30px; margin: 0 auto; background-color: #0070C0; display: flex; align-items: center; justify-content: center;"> <div style="width: 15px; height: 15px; background-color: white; border-radius: 50%;"></div> </div>	<div style="border: 1px solid #0070C0; border-radius: 50%; width: 30px; height: 30px; margin: 0 auto; background-color: #0070C0; display: flex; align-items: center; justify-content: center;"> <div style="width: 15px; height: 15px; background-color: white; border-radius: 50%;"></div> </div>	<div style="border: 1px solid #0070C0; border-radius: 50%; width: 30px; height: 30px; margin: 0 auto; background-color: #0070C0; display: flex; align-items: center; justify-content: center;"> <div style="width: 15px; height: 15px; background-color: white; border-radius: 50%;"></div> </div>	PERFORMANCE EFFICIENCY	
<div style="border: 1px solid #0070C0; border-radius: 50%; width: 30px; height: 30px; margin: 0 auto; background-color: #0070C0; display: flex; align-items: center; justify-content: center;"> <div style="width: 15px; height: 15px; background-color: white; border-radius: 50%;"></div> </div>	<div style="border: 1px solid #0070C0; border-radius: 50%; width: 30px; height: 30px; margin: 0 auto; background-color: #0070C0; display: flex; align-items: center; justify-content: center;"> <div style="width: 15px; height: 15px; background-color: white; border-radius: 50%;"></div> </div>	<div style="border: 1px solid #0070C0; border-radius: 50%; width: 30px; height: 30px; margin: 0 auto; background-color: #0070C0; display: flex; align-items: center; justify-content: center;"> <div style="width: 15px; height: 15px; background-color: white; border-radius: 50%;"></div> </div>	SECURITY	
<div style="border: 1px solid #0070C0; border-radius: 50%; width: 30px; height: 30px; margin: 0 auto; background-color: #0070C0; display: flex; align-items: center; justify-content: center;"> <div style="width: 15px; height: 15px; background-color: white; border-radius: 50%;"></div> </div>	<div style="border: 1px solid #0070C0; border-radius: 50%; width: 30px; height: 30px; margin: 0 auto; background-color: #0070C0; display: flex; align-items: center; justify-content: center;"> <div style="width: 15px; height: 15px; background-color: white; border-radius: 50%;"></div> </div>	<div style="border: 1px solid #0070C0; border-radius: 50%; width: 30px; height: 30px; margin: 0 auto; background-color: #0070C0; display: flex; align-items: center; justify-content: center;"> <div style="width: 15px; height: 15px; background-color: white; border-radius: 50%;"></div> </div>	MAINTAINABILITY	
<div style="border: 1px solid #0070C0; border-radius: 50%; width: 30px; height: 30px; margin: 0 auto; background-color: #0070C0; display: flex; align-items: center; justify-content: center;"> <div style="width: 15px; height: 15px; background-color: white; border-radius: 50%;"></div> </div>	<div style="border: 1px solid #0070C0; border-radius: 50%; width: 30px; height: 30px; margin: 0 auto; background-color: #0070C0; display: flex; align-items: center; justify-content: center;"> <div style="width: 15px; height: 15px; background-color: white; border-radius: 50%;"></div> </div>	<div style="border: 1px solid #0070C0; border-radius: 50%; width: 30px; height: 30px; margin: 0 auto; background-color: #0070C0; display: flex; align-items: center; justify-content: center;"> <div style="width: 15px; height: 15px; background-color: white; border-radius: 50%;"></div> </div>	FUNCTION POINTS	