# A Non-Arbitrary Method for Estimating IT Business Function Recovery Complexity via Software Complexity

*Ing. Athanasios Podaras, Ph.D*

*Faculty of Economics, Department of Informatics, Technical University of Liberec, Czech Republic*

# Contents

- GOAL – Introduction of the ***Business Continuity Points Method***
- PROBLEM DEFINITION – **Why** to formulate the new Non-Arbitrary Method and **which is the Theory Behind?**
- **Description of the Method**
- Mapping between the root theory **(Use Case Points)** and the contribution **(Business Continuity Points)**
- Recovery Time Estimation
- Business Function Recovery Scenarios
- Issues for Discussion
- Conclusions – Further Steps

# Goal

Creation of a model for estimating business function recovery complexity in order to predict reasonable recovery timeframes in case of an unexpected information system failure.

# INTRODUCTION TO THE METHOD

**Business continuity** focuses on ensuring an organization can continue to provide services when faced with various crisis events ***(Miller & Engemann, 2012)***

**Business Continuity Points Method, aims to**

assist Business Continuity Managers in managing business function recovery time, via a **non-arbitrary** business process complexity estimation process

# Problem Definition - Background

- In BCM (Business Continuity Management) Recovery Time Estimation is implemented with:
- RATIONAL TIME OBJECTIVE (RTO)
- MAXIMUM ACCEPTABLE OUTAGE (MAO)

- Currently the RTO and MAO timeframes are defined:

a)**Empirically**

b) **Arbitrarily**

# Problem Definition - Background

The 4 Levels of RTO and MAO Timeframes ***(Gibbson, 2010)***

- **Level 1**: The business function should operate without any interruption. Online systems must be available 24 hours per day and 7 days per week.

  MAO = 2 hours

  RTO < 2 hours

- **Level 2**: The business processes can survive without the business function for a short amount of time.

  MAO = 24 hours (1 day)

  RTO < 24 hours

- **Level 3**: The business processes can survive without the business function for one or more days.

  MAO = 72 hours (3 days)

  RTO < 72 hours

- **Level 4**: The business processes can survive without the business function for extended periods.

  MAO = 168 hours (1 week)

  RTO < 168 hours

# Problem Definition - Background

**The proposed contribution is a:**

- standard
- rational
- mathematical and
- non-arbitrary

approach to the estimation of RTO and MAO Business Continuity Timeframes

# Description of the Business Continuity Points Method

**Background**

The method is based on the Use Case Points Method, because it:

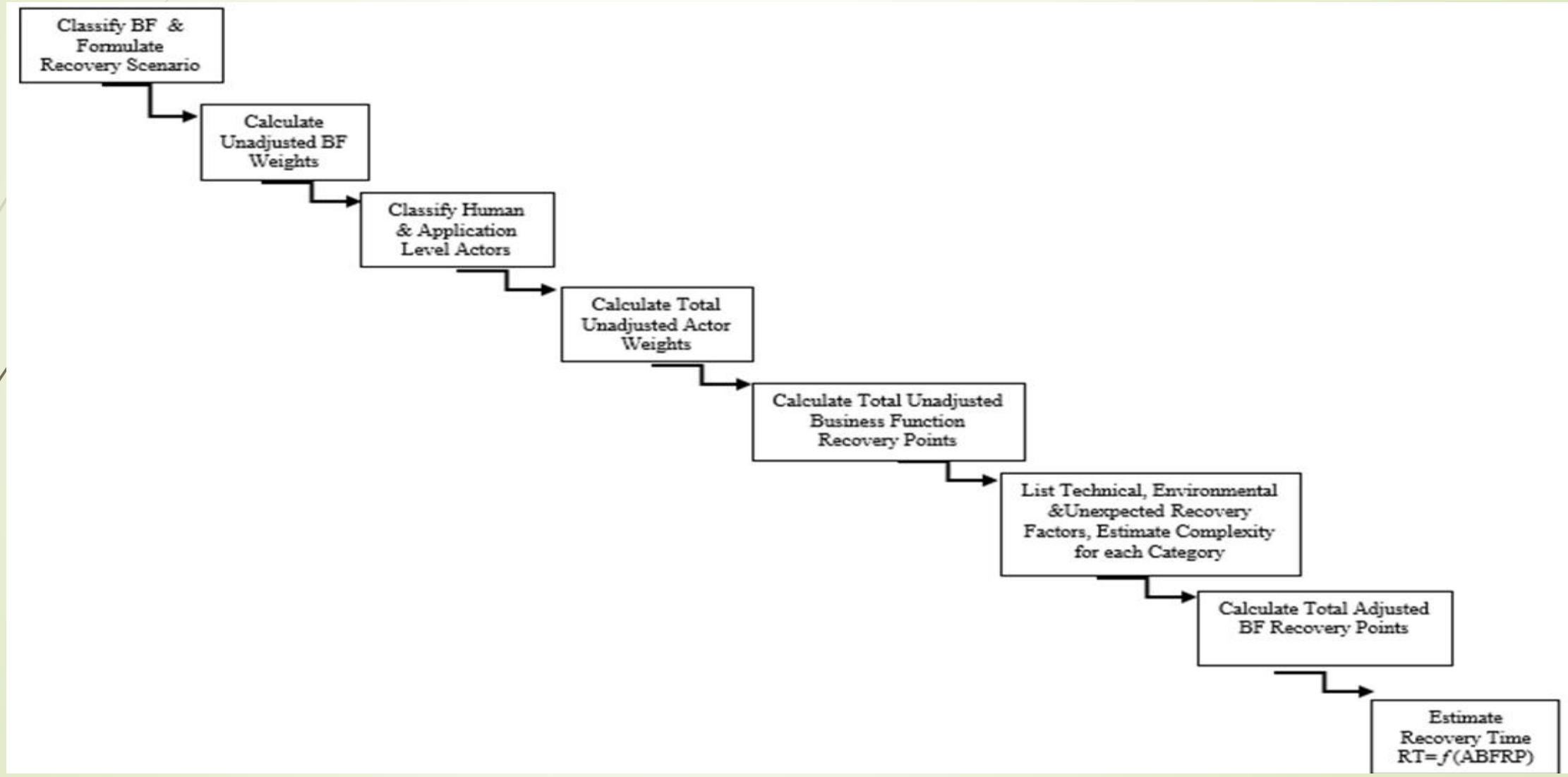
- Estimates System/SW Complexity
- Is based on **Use Cases** which is a Requirement Analysis Tool
- Is practically tested

**Improvements**

The Business Continuity Points should not include:

- Standard number of Factors (flexibility)
- Arbitrary Weight Assignment of Factors

# Description of the Business Continuity Points Method



# Description of the Method

**Classification of Business Functions**

- *Simple Business Function* in which Number of Business Processes is <= 3,
- *Average Business Function* in which Number of Business Processes is >=4 and <=7Complex
- *Complex Business Function* in which Number of Business Processes is >7.

**Calculation of the Unadjusted Business Function Weights**

$$UBFW = \sum_{i=1}^{n} (BF_i \times W_i)$$

Where, n = Number of Business Processes,

$BF_i$ = Type of the given Business Function i and

$W_i$ = Weight of the corresponding Business Function

# Description of the Method

**Classification of Actors**

**a) <u>Human Level Actors</u>:**

- *Level 1 (Complex)*: IT Managers on top of the IT Department or a corresponding division in a company who are leaders of the Business Continuity team.
- *Level 2 (Average)*: IT subdirectors or supervisors of an IT Section who are members of the recovery team
- *Level 3 (Simple)*: Employees of an IT Department who are members of the recovery team

**Calculation of the Unadjusted Human Weights (UHW)**

$$UHW = \sum_{i=1}^{n} (A1_i \times W_i)$$

where $A1_i$ is Human Level Actor I

$W_i$ is the Actor's Weight, for Human Level Actors

# Description of the Method

**Classification of Actors**

**b) <u>Application Level Actors</u>:**

**Calculation of the Unadjusted Human Weights (UHW)**

$$UAPW = \sum_{i=1}^{n} (A2_i \times W_i)$$

where $A2_i$ is Application Level Actor i

$W_i$ is the Actor's Weight, for Application Level Actors

**Calculation of the Total Unadjusted Human Weights (TUAW)**

$$TUAW = UHW + UAPW$$

**Calculation of the Unadjusted Business Function Recovery Points**

$$UBFRP = TUAW + UBFW$$

# Description of the Method

**Classification of Factors** (which may influence the Business Function Recovery Procedure)

- **Technical Recovery Factors (TRF)**
- **Environmental Recovery Factors (ERF)**
- **Unexpected Recovery Factors (URF)**

**Weight assignment for each factor**: *RANK ORDER CENTROID (ROC) Approach*

$$Wi = \frac{1}{m} \times \sum_{n=1}^{m} \frac{1}{n}$$

where $W_i$ is the Weight Value of the $i^{th}$ item, and m denotes the number of items (factors)

***Enhances the Flexibility*** *(permits unlimited number of factors)*

***Avoids Arbitrary Assignment*** *of Weights*

# Description of the Method

**Assessment Values and Formulas for Each Category of Factors**

| Assessment Value | Boolean (YES/NO) | Non-Boolean |
|---|---|---|
| *Ascending Scale* | 1, 4 | 1, 2, 3, 4 |
| *Descending Scale* | 4, 1 | 4, 3, 2, 1 |

$$TRF = 0.75 + \frac{1}{100} \times \sum_{i=1}^{n} (F_i \times W_i)$$

# Description of the Method

- Estimation of the ***Adjusted Business Function Recovery Points (ABFRP)***

$$ABFRP = UBFRP * TRF * ERF * URF$$

- Estimation of the ***Recovery Time (RT)***

$$RT = 0.15 * ABFRP^2 - 1$$

# Mapping between UCP and Business Continuity Points

| | Use Case Points | Business Continuity Points |
|---|---|---|
| Estimated Complexity Type | Software Complexity Estimation | Business Function Recovery Complexity Estimation |
| Actors | Actors classified as Simple, Average and Complex, utilized to calculate the Unadjusted Actor Weight value (UAW) | Includes Human and Application Level Actors. Each Actor Type is classified as Simple, Average and Complex, utilized to calculate Unadjusted Human Weights (UHW) and Unadjusted Application Weights (UAPW) values |
| Use Cases vs Business Functions | Use Cases are classified as Simple, Average and Complex (according to the number of involved transactions), utilized to calculate Unadjusted Use Case Weights | Business Functions are classified as Simple, Average and Complex (according to the number of involved processes), utilized to estimate Unadjusted Business Function Weights (UBFW) |
| Unadjusted Points Estimation | Unadjusted Use Case Points : UCP = UAW + UUCW | Unadjusted Business Function Recovery Points: UBFRP = TUAW + UBFW |
| Technical Factors | 13 Technical Factors (Limited Number) | Unlimited Number of Technical Recovery Factors |
| Environmental Factors | 8 Environmental Factors (Limited Number) | Unlimited Number of Environmental Recovery Factors |
| Unexpected Factors | No Unexpected Factors are Considered | Unlimited Number of Unexpected Recovery Factors |
| Method of Weight Assignment | Based on the experience of IT Project Manager | Based On Standard Mathematical Approach (Rank Order Centroid) |
| Adjusted Points Estimation | Adjusted Use Case Points (UPC) | Adjusted Business Function Recovery Points (ABFRP) |

# Business Function Recovery Scenarios

**Simple Scenario.**

- *Human Level Actors:* 1 Complex, 1 Average and 1 Simple
- *Application Level Actors in BF:* 1 Complex, 1 Average and 1 Simple
- Business Processes in BF 1 Complex, 1 Average and 1 Simple

**Average Scenario**

- *Human Level Actors in BF:* 1 Complex, 2 Average and 2 Simple
- *Application Level Actors in BF:* 1 Complex, 2 Average and 2 Simple
- Business Processes in BF 2 Complex, 2 Average and 2 Simple

**Complex Scenario**:

- *Human Level Actors in BF:* 1 Complex, 3 Average and 3 Simple
- *Application Level Actors in BF:* 1 Complex, 3 Average and 3 Simple
- Business Processes in BF 3 Complex, 3 Average and 3 Simple

# Comparison between the Estimated Recovery Time Values by the Business Continuity Points and the Currently Proposed Timeframes

| Recovery Scenario | URF | ABFRP | Recovery Time (RT) (Hours) | RTO | MAO |
|---|---|---|---|---|---|
| *Simple* | 0.75 | 3.8 | ~ 1.2 | < 2h | 2h |
| *Average* | 1 | 15 | ~ 32 | <24h | 72h |
| *Complex* | 1.25 | 41.01 | **~ 251** | <168h | 168h |

# Discussion Issues

- Estimation of Business Process Recovery Complexity with a similar Algorithm as in the case of SW Complexity
- Current Business Process Complexity literature focuses on time estimation of a business process execution according to historic data (no predictive approaches are proposed)
- The currently proposed method supports **PREDICTION (of the time required to recover a business function/process- no past data is available BCP Formulators)**
- Time deviation in the COMPLEX RECOVERY SCENARIO is reasonable since the factors appear in their most severe form

# CONCLUSIONS – FUTURE WORK

- A Theoretical Approach to efficient and timely IT Business Function Recovery is illustrated
- The Business Continuity Points is based on the Use Case Points Method
- The Method supports estimation of RTO and MAO Values in a predictive manner
- The validity of the method is controlled with the comparison of the timeframes obtained with regard to various crisis scenarios (simple, average and complex), with RTO and MAO values proposed by experts
- Future implementation is demanded for ensuring more the validity of the method
- The research team develops scenarios regarding failover of various IT business functions of the TUL
- The method will be supported by a currently developed interface (initial tool is VBA Excel)

# Thank you for you attention!!!!

*Athanasios Podaras*

*athanasios.podaras@tul.cz*