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Simulating the Effects of Disorder on Goal Setting and Task Performance

Dinuka Herath
Dept. of HRM & Org. Behaviour,
Business School, Bournemouth U. (UK)
Dinuka.Herath@bournemouth.ac.uk

Davide Secchi, PhD
Head of Research Dept. of HRM & Org. Behaviour,
Senior Lecturer, Business School, Bournemouth U. (UK)

Fabian Homberg
Senior Lecturer Dept. of HRM & Org. Behaviour,
Business School, Bournemouth U. (UK)
Introducing Disorder

Disorder  =  Disorganisation  =  Mess
Problem Statement

• First introduced in the 60’s (Merton, 1968; Crozier, 1969; Cohen et al., 1972)

• Over the years various definitions have been given (Warglien and Masuch, 1996; Abrahmson, 2002)

• None of them have reached consensus

• **Problem Statement**

  • Define “disorganisation” (provide a theoretical clarification of the current definitions
    • Characteristics
    • Causes
    • Consequences

Our Target
"Disorderly accumulation of varied entities in hierarchically ordered complex human structures"

(Abrahamson, 2002)

<table>
<thead>
<tr>
<th>Disorderly Accumulation</th>
<th>Varied Entities</th>
<th>Hierarchically Ordered</th>
<th>Complex Human Structure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unplanned and unintended aggregation</td>
<td>People, Relationships, Physical entities (tables, chairs, etc.), problems, solutions, opportunities</td>
<td>Organisations with defined chain of command where each level is responsible for a certain set of tasks</td>
<td>Organisations are complex human systems</td>
</tr>
</tbody>
</table>

Table 1: Defining the Terms based on (Abrahamson, 2002; Abrahamson and Freedman, 2006)
The Model

**Disorganisation**
- Occurs at every hierarchical level of the organisation
- Happens at every reference point of the organisation i.e. individual, team, departmental, organisational
- Like it or not, this is an unavoidable phenomenon

**Goal Setting**
- Occurs at every hierarchical level of the organisation
- Happens at every reference point of the organisation i.e. individual, team, departmental, organisational
- Essential to a organisation
Goal Setting Theory

“Hard goals lead to better task performance than vague (less defined) or easy goals if the individual has the efficacy, commitment and is not conflicted with other goals”

(Locke and Latham, 1990)

1. Goals that are Hard &/Or Well Defined
2. Lead to Better Task Performance
3. As opposed to Easy &/Or Vague Goals
4. When a Individual has Efficacy, Commitment and no conflicts
Theoretical Framework

- Disorganisation
  - Goal Setting
  - Organisation

- Garbage Can ABM (Fioretti 2008)
- Garbage Can Model (March 1971)

- E A Locke 1990
- Our ABM Model
The Model

- Two scenarios are modelled
  - Disorganisation
  - Organisation

- 4 Types of Agents

<table>
<thead>
<tr>
<th>Employee (E)</th>
<th>Efficacy (e), Ability (a), Motivation (m), level (l)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Problem (P)</td>
<td>Difficulty (d), level (l)</td>
</tr>
<tr>
<td>Solution (S)</td>
<td>Efficiency, level (l)</td>
</tr>
<tr>
<td>Opportunity (O)</td>
<td>Level (l)</td>
</tr>
</tbody>
</table>
The Model – Movement

• Disorganised
  – Agents move freely
    • Randomly selected directions

• Organised (Hierarchy)
  – Employees only move to corresponding P,S,O
  – IF
    \[ E_l \neq P_l \text{ OR } E_l \neq S_l \text{ OR } E_l \neq O_l \]
  – Repulsion Happens
The Model – Decisions

• Decision Making
  – Resolution
    • Happens when all 4 agents are in one patch

\[ E(a\times m\times e) + S_{me} (ef) \geq P(d) \]

– Fail & Redistribution

\[ E(a\times m\times e) + S_{me} (ef) < P(d) \]

Increase Fail Count -> \( F_c = F_c + 1 \)

[Random redistribution]
The Model – Increments and Reporting

- Resolution Count Increments

\[ Rc = Rc + 1 \]

- IF HARD Goal \( \rightarrow 2 \times (E(a \times m \times e)) < P(d) \)

  Increase Motivation \( \rightarrow E(m) = E(m) + 2 \)

- IF EASY Goal \( \rightarrow 2 \times (E(a \times m \times e)) \geq P(d) \)

  Increase Motivation \( \rightarrow E(m) = E(m) + 1 \)
The Model – Reporting

- The number of participants, opportunities, solutions and problems that are in the organization at any point in time
- Total efficiency of solutions
- Total difficulty of problems
- The number of completed tasks
- The number of failed tasks
- Comparison between failed and completed
Difficulties

• Movement Structure
  – Getting all agents into one place

• Motivation Equation
  – $2 \times (E(a \times m \times e)) \geq P(d)$

• Introducing new variables
Conclusion & Outlook

• The next step is to complete the simulation
  – Test and optimise
  – Run and Gather data
  – Data analysis

• Upon complete we aim to determine
  – Characteristics of Disorganisation
  – Causes and Consequences
Thank You!

Q & A
References


Screenshot
The Basis

• PhD Research - Exploring Benefits of Disorganisation Management
  • Define “disorganisation” (provide a theoretical clarification of the current definitions
    • Characteristics
    • Causes
    • Consequences
  • Measure disorganisation
    • Can we objectively measure the “disorganisation in an organisation”
    • BDVI Model (Abrahamson, 2002)
  • Are the proposed benefits real? (are there empirical evidence)
    • If true, can we optimise the “disorganisation” to achieve favourable outcomes for the organisation

Our Target
• Merton (1968) and Crozier (1969) Theory of Blockage (Why Disorder is needed)
Timeline of The Concept

• Discussed in 1971 by Cohen, March and Olsen
  – Garbage Can Model
  – Very well established theory

[Diagram showing Traditional Organisation and Garbage Can Model]
Practical Implications

Amagasaki Rail Crash, Japan 2005

NTSB Found JR West’s increased formalisation was a key contributor (Chikudate, 2009)
1980 – Present

• The Logic of Disorganisation (Warglien and Masuch, 1996)

• Theory of Disorder (Abrahamson, 2002)
  – Types of Disorders
    • To Organise Mess
    • Organise Mess
    • Discard Mess

• Benefits of Disorder (Abrhamson and Freedman, 2007)
  – Comparison with order
  – Cost benefit analysis idea

• Garbage Can Buck (Fioretti and Lomim 2008)
  – ABM of the Garbage can model (March and Olsen 1972)
Assumptions

• Agents don’t exit the system
• Engagement with a problem means a goal has already been set
Further Reading

• Some Journals

1. AMJ (Academy of Management Journal)
2. Research In Organisational Behaviour
3. Logic of Organizational Disorder - Walter De Gruyter
4. Journal of Service Industry Management
5. Organisational Research Methods
6. Journal of Artificial Societies and Social Simulation
7. Simulation Modelling Practice and Theory

• Some books

1. A Perfect Mess: The Hidden Benefits of Disorder, LBC
2. The Logic of Organisational Disorder, De Gruyter
3. New Developments in Goal Setting and Task Performance, Cenveo
Theoretical Basis for PhD

- Rational
- Natural
- Open

Conceptual View (Scott 1981)

Directly Attack This View

Disorganisation

Compliments, but does not fully align itself to either
Benefits of Disorder

• Open to Innovation (Juxtaposing things)
  – Recombination and Mixture

• Involves more stakeholders in decision making

• Saves money

• Rapid solution development

(Warglien and Masuch, 1996, Abrahamson, 2002; Abrahamson and Freedman, 2007)
Why ABM?

- Captures emergent phenomena
- Closer to real world interaction as opposed to equation based modelling. (More natural and EBM)
- Can accommodate multiple scales
- Faster and straight forward development capability
- Strategy can be tested using ABM

(Gilbert, 2000; Gilbert, 2008; Bazghandi, 2012, Seccchi, 2013)
ABM References


Loose Coupling

• Discussed by Glassman, 1973 and Weick 1976
  – Weick brought the concept to management

• Idea in object oriented development

• One class pointing to another class while have minimal knowledge of the other class

• Relationship maintains even though the classes change substantially
Further Development

• Varying problem, solution and opportunity types
  – Stationary
  – Mobile

• Movement Interaction
  – O -> P (opportunity moves to problem)
    • In order of problem difficulty
  – E -> P (employee moves to problem)
    • In order of problem difficulty
  – E,P,O -> S (all three moves towards a solution)
    • In order of solution efficiency

• This process get complicated when types of agents are added to the mix
Further Development

• Introduction of the concept of “training” as acquisition of skills.

  – A set of stationary training agents will be added to the solution space

  – A employee will be sent to “training” if the following condition is met

    1) Every instance when an “problem” is not solved, the employee fail count \( (E_{fc}) \) would increase

    2) Then, IF

        \[ E_{fc} \geq 5 \]

        Move employee towards training agent.

    3) Every interaction an employee has with a training agents increases \( E_{m} \) (motivation) by a predefined amount or based on a calculation.