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# Business Transformation Success Dynamics; It's the Communication

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*ABSTRACT: A Study of Business Transformation(BT) Success involving fifteen corporations framed business transformation as a type of large-scale strategic renewal implemented via a diffusion of innovation process within a socially constructed organisational environment. Based on the qualitative and quantitative analysis of the communication patterns examined in this study, the complex relationships were abstracted and reflected in an adapted diffusion of innovation dynamic model that has communication effectiveness as a key influencing variable.*

*The key findings of the communications network analysis(CNA) showed that success was correlated with average path length, opinion leadership and the presence of weak ties, with a saturation effect on communication after a certain network density is reached (referred to in CNA literature as percolation effect).*

*Simulation runs replicating observed BT Success Index measures with group size, activity, average path length, connectedness and leadership, adjusted for quit percentage per year showed that with one variable missing the successful implementation is delayed, two variables missing results in failure and that a saturation point for communication exists.*

KEYWORDS: INNOVATION DIFFUSION, BUSINESS TRANSFORMATION, SOCAL NETWORK ANALYSIS, COMMUNICATIONS

## Introduction

Business Transformation (BT) is an type of large scale organisational change which results in sustained improvement in capability to meet changing customer or market needs (Hammer and Champy, 1993).. This form of strategic renewal is usually enabled by information technology, which allows design of business processes and requires skilful management of the organization and its people to be successful (Davenport 1993, O'Neill and Sohal, 1999).

The science of complexity has a number of insights to offer about the nature of interactions in human systems (Waldrop 1993, McElroy 2000). A subset of complexity science is complex adaptive systems (CAS) theory, which holds that living systems, including organizations, self organise and continuously fit themselves to ever changing conditions in the environment. CAS theory states that this occurs by modifying their knowledge of fact and practice as a consequence of their interaction with their environment and the feedback effects of their own and others interaction (Holland 1995). The traditional, deterministic view of change, is where people as collections of objects can be manipulated to form social systems that create new ideas and organisational capabilities. The complex, dynamic view starts with knowledge in organizations being an emergent social process. Human social systems give rise to collective knowledge making by their members as a by-product of their communication, learning and interaction. CAS are said to be driven by three control parameters, the rate of information flow through the system, the richness of the connectivity between agents in the system and the level of diversity of the agents (Stacey 1996).

This view of change is consistent with the diffusion of innovation literature (Rogers 1995), which has been represented in system dynamics world as a form of epidemic spread, such as the Bass diffusion model (Bass 1969, Sterman 2000). Communications has always featured strongly in these models, and more structured techniques of communication network analysis have explored the structure, rate and quality of communication, within and among the groups comprising organizations (Scott 1991, Nohria and Eccles 1992, Scott 1996, Krebs 2000). This paper describes an adaptation of the diffusion of innovation model to incorporate results of a study, performed by one of the authors (Wing 2001), comparing the success of large BT projects in 15 companies with the structure of their communications.

**Study Overview**

An international study of 15 companies undertaking BT projects was designed to investigate the variables which explain BT success. A BT success index (BTSI) was constructed based on the implementation time and level of capability achieved, adjusting for the complexity of the project (Wing 2001). Data was collected using structured questionnaires administered to project team members and independent experts. Quantitative and qualitative communication network analysis was performed on the BT project team using Inflow software (Krebs,1995). These results were correlated with the BTSI and showed communication as the pivotal explanatory variable in explaining BT success. The elicited communications patterns were incorporated into previous system dynamics modelling work jointly performed by the authors on diffusion of innovation, using ithink software.

**Communication Network Analysis**

This consisted of calculation of measures of centrality and connectedness, including group size, average path length, degree, closeness, reach, and activity, and the visualisation of communication structures, via the use of network maps or sociograms (Krebs 1996). The network maps are presented based on the following conventions:

The sociogram represents the entire population of people involved in the BT project;

Each block represents an organisational sub-group (i.e. department or workgroup);

The name associated with each organisational sub-group is the companies abbreviation for that group, e.g. ‘executives’ is the executive team, ‘IT’ is the IT department;
‘Externals’ are those groups of people that the BT team communicate with that are outside the organization, e.g. academics, consultants;
Full lines are two-way confirmed communication;
Dotted lines are one-way communication.

The three figures that follow this example depict the network maps for the lowest, highest and mid-range BTSI companies from this study.

Figure 1 : Lowest BTSI – Company 76

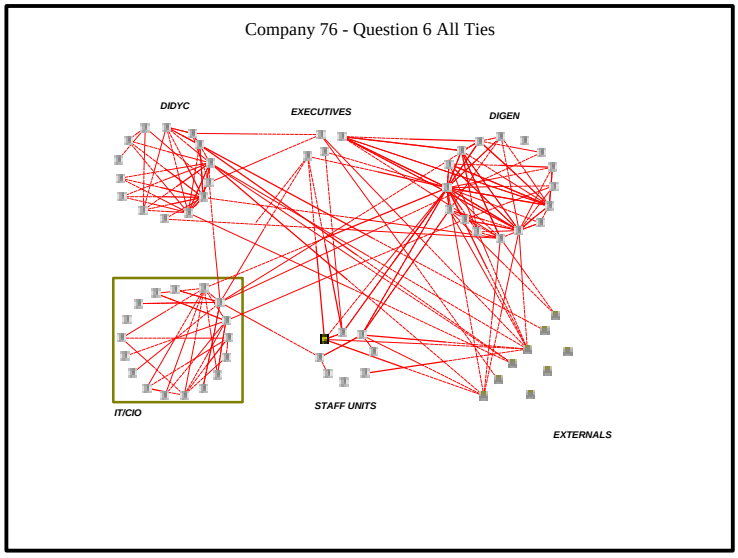


Figure 2 : Mid Score BTSI – Company 62

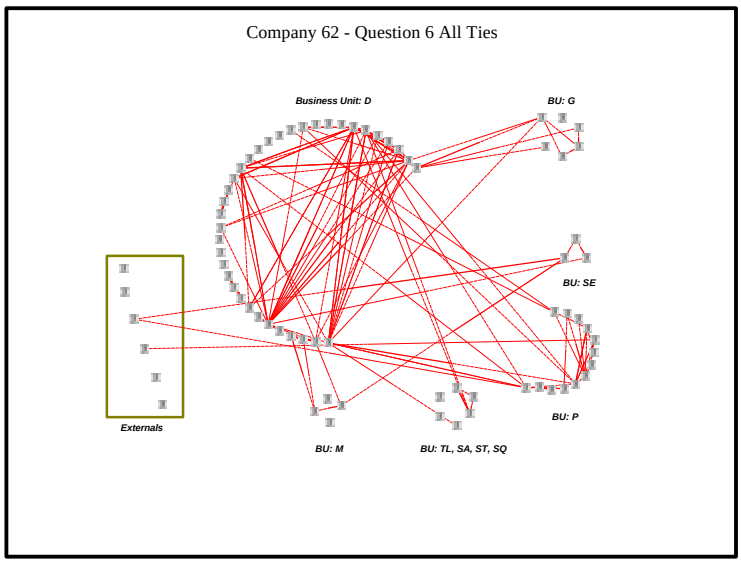
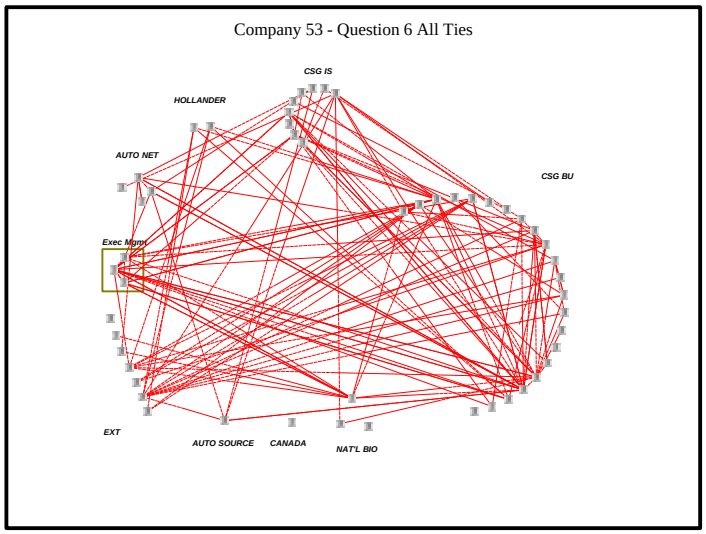



Figure 3 : Highest BTSI – Company 53




## CNA Results

*1.Presence of Weak Ties*

Lower levels of network hierarchy (as defined by the predominance of hub and spoke, or interlocking personal networks, structures) are associated with higher levels of BT success. This is an indicator that the presence of weak ties within the network is associated with higher levels of BT success.

*2. Locus of Communication*
Lower levels of network fragmentation (as defined by the isolation of individuals or groups from the rest of the network) are associated with higher levels of BT success. This also supports the existence of weak ties being associated with higher levels of BT success, as weak ties add a bridge between homophilous or fragmented groups.

*3. Opinion Leadership within the Network*
Opinion leadership (as defined by the communication activity around an individual) is associated with higher levels of BT success.

*4. Network Density – 'The Percolation Effect'*
Network density (as defined by the volume of communication flows across the network) is associated with higher levels of BT success up to a threshold level, at which point, increased levels of density are associated with decreasing levels of BT success.

**System Dynamics Model of BT Success**

Some of the specific relationships embodied in the model are:

1. Adopters
   - Three classes – potential, active and former
   - Potential adopters interact with former adopters of innovation through weak ties.

2. Innovation
   - a base level of innovation attractiveness exists
   - this is modified by the leadership within the system.

3. Percolation Effect

The study reported potential diminishing returns on the level of communication activity. This could be due to either information overload or too much communicating, not enough doing. This dynamic is also captured in the systems model by identifying optimum activity and the feedback on "infectivity" or influence rates

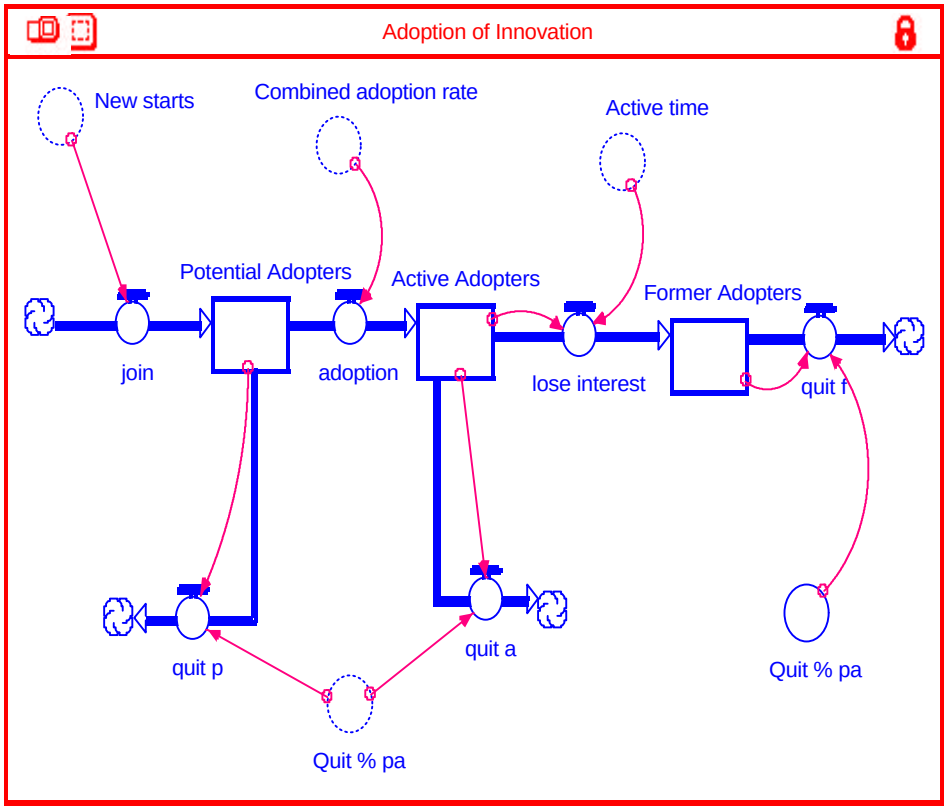
4. The innovation must not only be implemented and used it must continue to deliver the planned business benefits. The model allows for a ongoing weak tie connection and a honeymoon period dynamic. This attempts to cater for the ongoing learning process embodied in the structure and dynamics of the model.

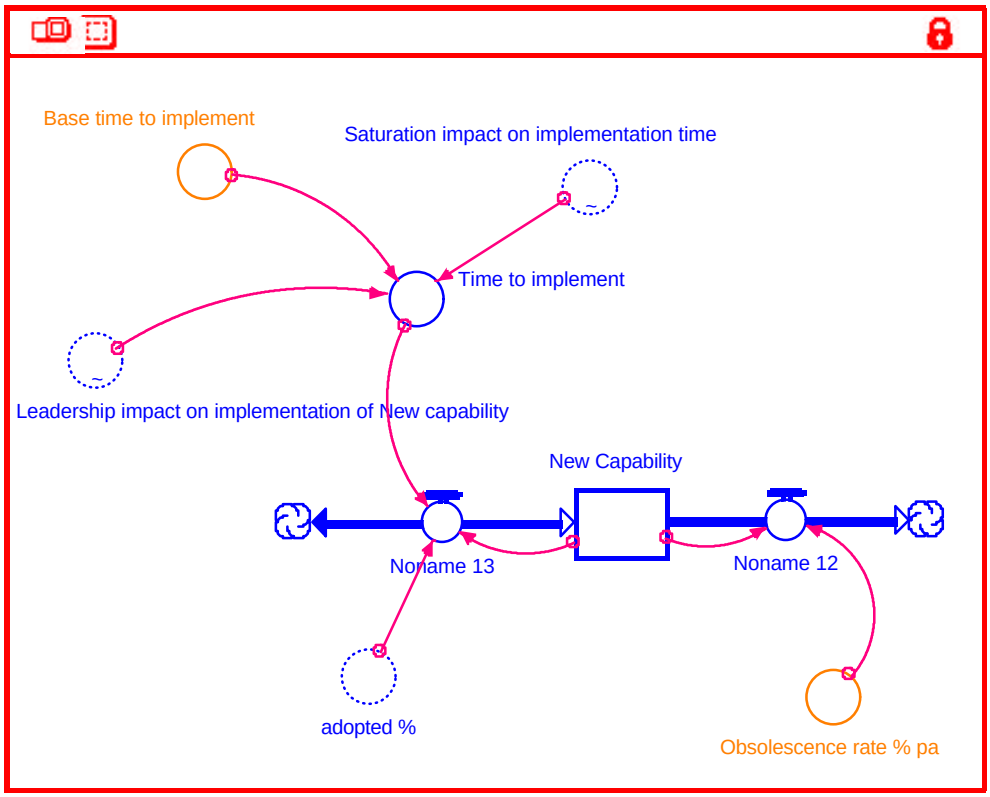
The system dynamics model has been developed as an eight sector model . The following table provides an overview of the relationships and variables embodied in each of these sectors of the model. A graphical representation of the model , as produced by "ithink", follows this table.

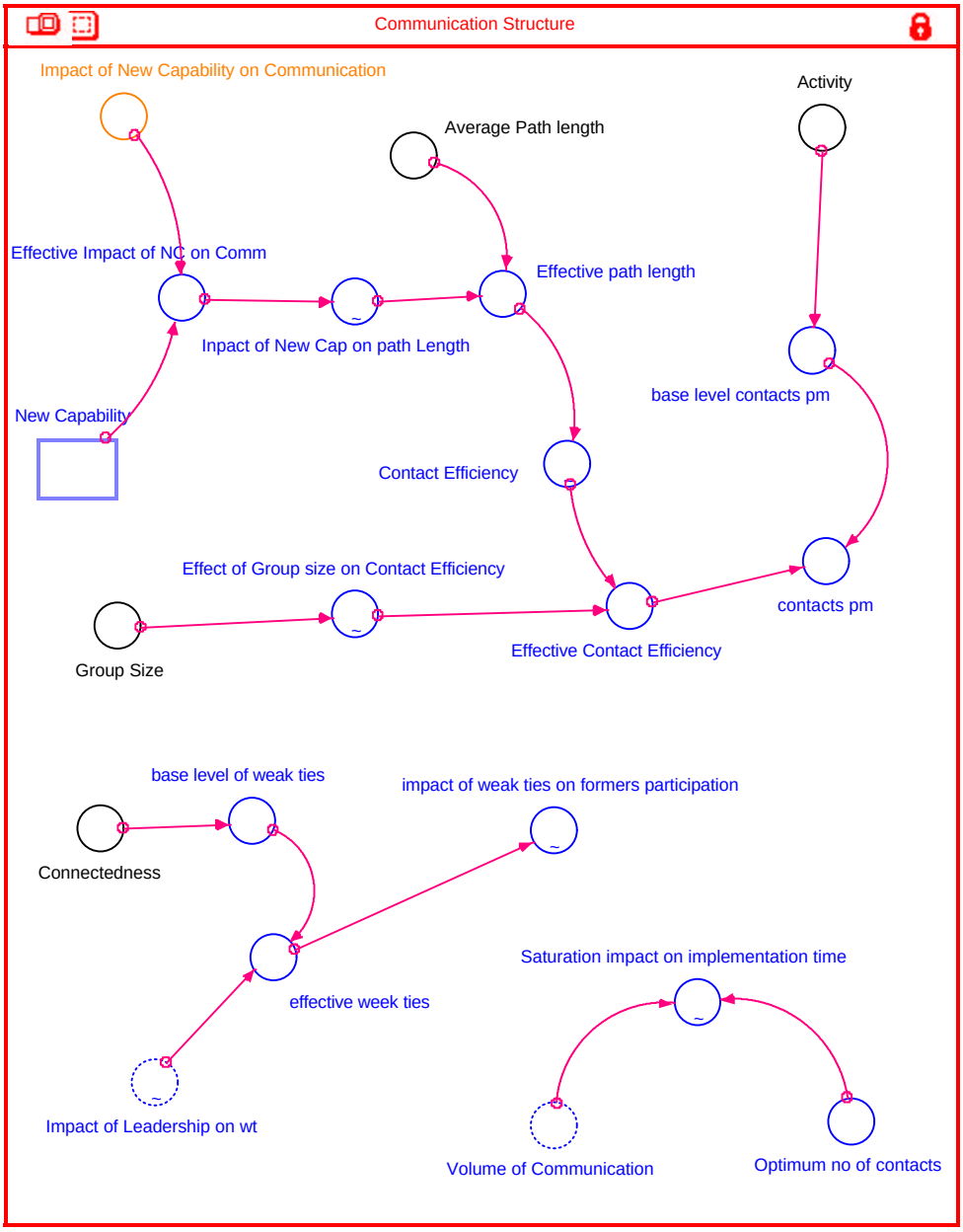
Table 8.6.1

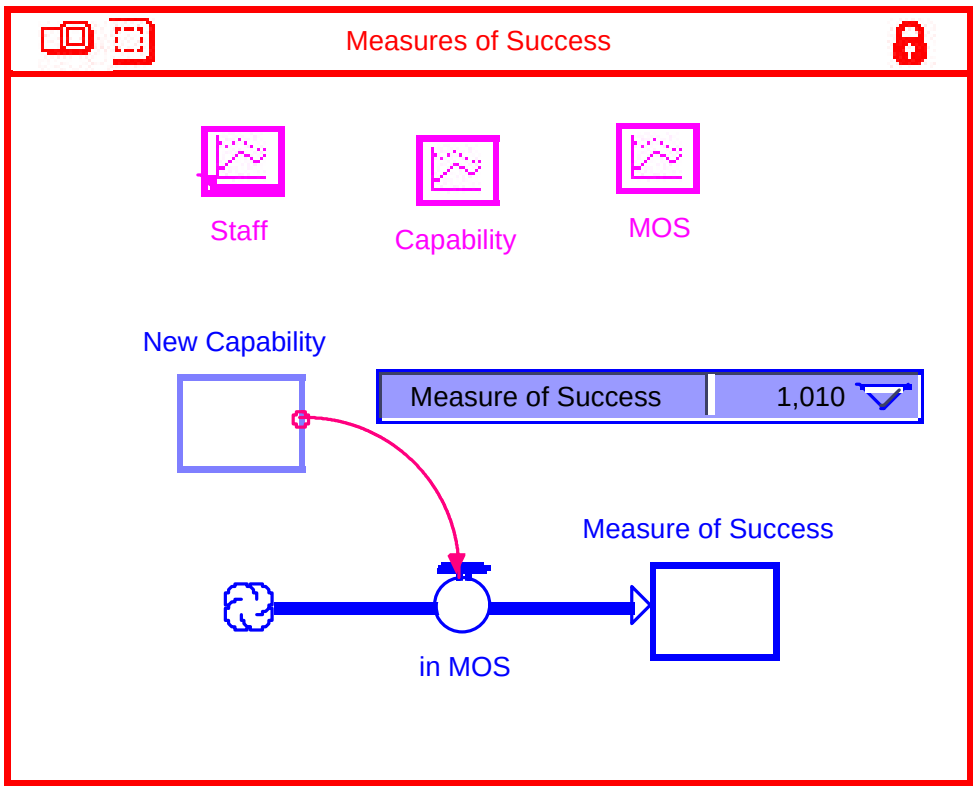
| Model Sector | Variables and Relationships | Source |
|---|---|---|
| 1. Adoption of Innovation | ▪ 3 agents- potential, active and former adopters.<br>▪ All agents have quit rates from the innovation | ▪ Bass model of diffusion<br>▪ Infection model of diffusion |
| 2. BT Success | Implementation of a new organisational capability (IT enabled business process) | Thesis |
| 3. Conversion of an innovation into a new capability | Influenced by;<br>▪ Time to implement<br>▪ Leadership<br>▪ Obsolescence rate (usage of the new capability must be sustained over time to be successful) | <br>Thesis<br>Thesis<br>CAS Theory |
| 4.Communication Structures | Overall effectiveness of communication structures are influenced by;<br>▪ APL<br>▪ Activity levels<br>▪ Group size<br>▪ Weak ties<br>This sector also models feedback loops from;<br>▪ The new capability<br>▪ leadership | Thesis |
| 5. Adoption Rates | Models adoption rates based on the interaction between potential, active and former adopters. The sections also models informal communication (word of mouth) and weak ties. | ▪ Bass diffusion model<br>▪ Thesis |
| 6. Communication network | A base word of mouth level is modified by the interaction between agents | Bass model of diffusion |
| 7. Leadership | Leadership in the communication network is influenced by the level of management interest. Leadership has a feedback effect on infectivity (diffusion) rates and the implementation of a new capability | ▪ Thesis<br>▪ CAS theory |
| 8. Management Interest | Management interest is influenced by management conviction over time and the feedback from the success of the new capability | Bass diffusion model |

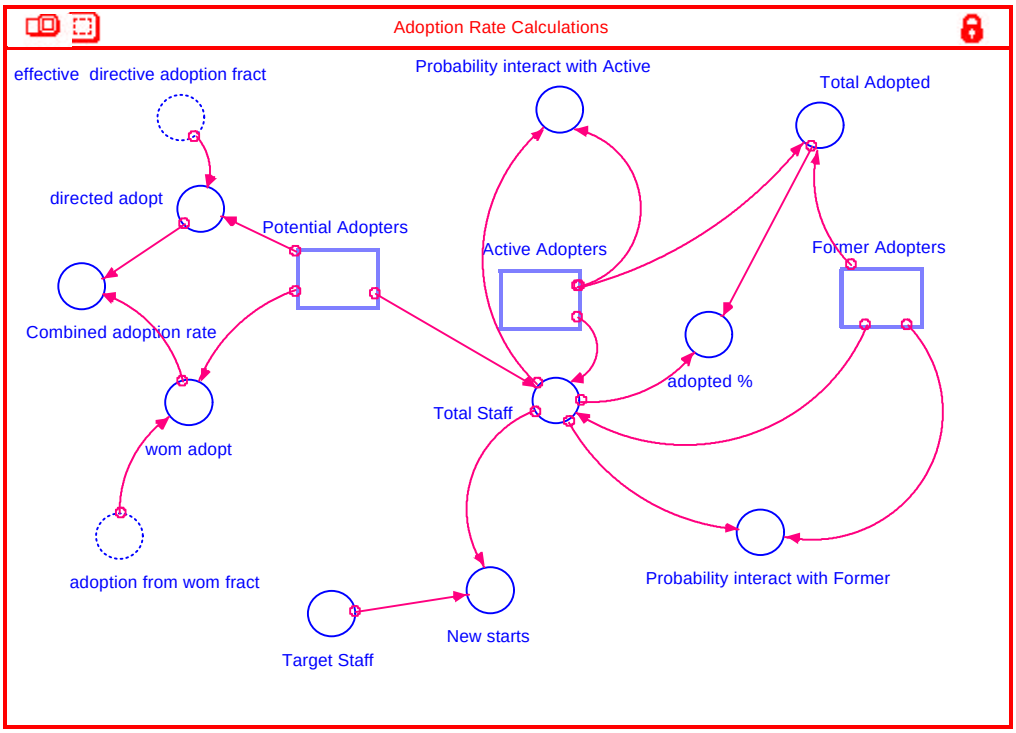
The system dynamics model developed from the above design parameters is set out in graphical form , by sector in the following diagrams

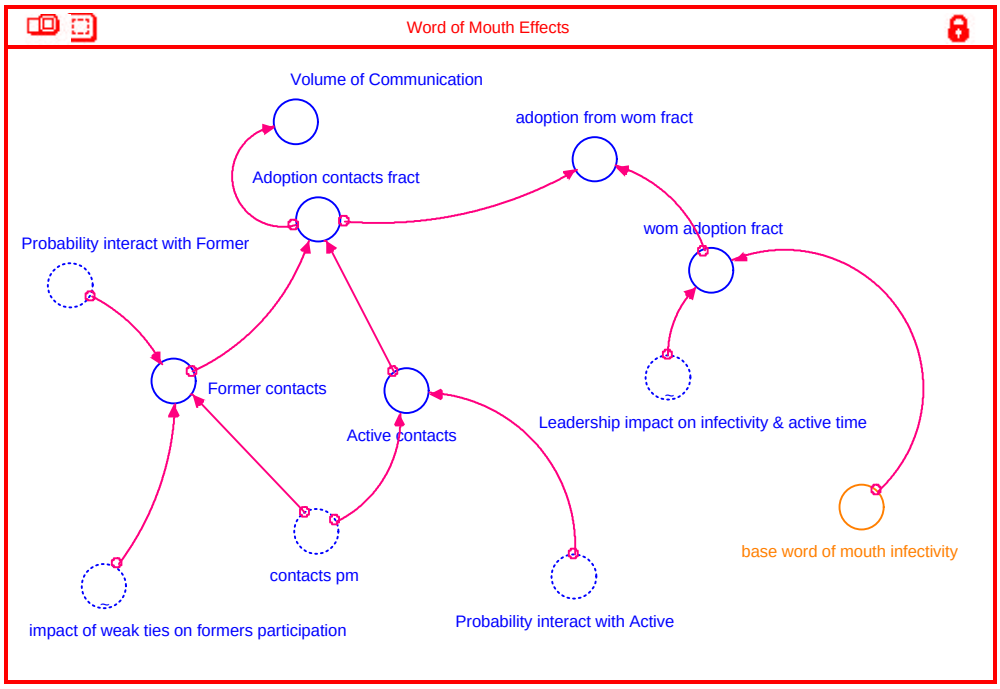


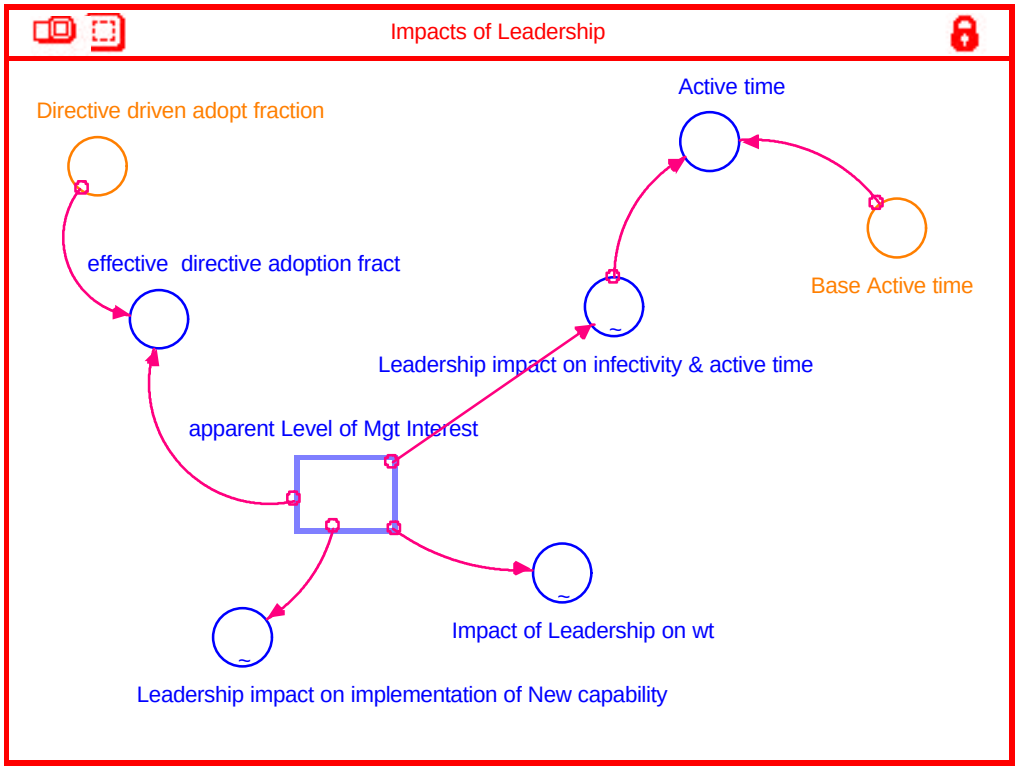

Base time to implement
Saturation impact on implementation time
Time to implement
Leadership impact on implementation of New capability
New Capability
Noname 13
Noname 12
adopted %
Obsolescence rate % pa

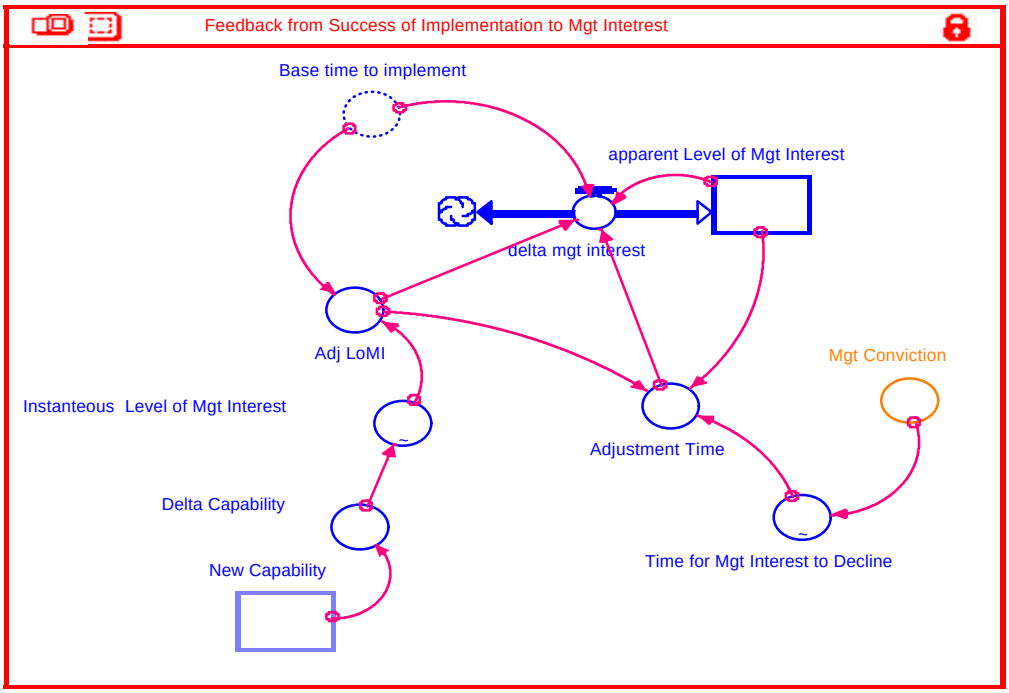

Communication Structure
Impact of New Capability on Communication
Activity
Average Path length
Effective Impact of NC on Comm
Effective path length
Inpact of New Cap on path Length
base level contacts pm
New Capability
Contact Efficiency
Effect of Group size on Contact Efficiency
contacts pm
Group Size
Effective Contact Efficiency
base level of weak ties
impact of weak ties on formers participation
Connectedness
Saturation impact on implementation time
effective week ties
Impact of Leadership on wt
Volume of Communication
Optimum no of contacts


Measures of Success
Staff
Capability
MOS
New Capability
Measure of Success
1,010
Measure of Success
in MOS


Adoption Rate Calculations
effective directive adoption fract
directed adopt
Potential Adopters
Combined adoption rate
wom adopt
adoption from wom fract
Probability interact with Active
Active Adopters
Total Staff
Target Staff
New starts
Total Adopted
Former Adopters
adopted %
Probability interact with Former


Word of Mouth Effects
Volume of Communication
adoption from wom fract
Adoption contacts fract
Probability interact with Former
wom adoption fract
Former contacts
Active contacts
Leadership impact on infectivity & active time
base word of mouth infectivity
contacts pm
impact of weak ties on formers participation
Probability interact with Active


Impacts of Leadership
Active time
Directive driven adopt fraction
effective directive adoption fract
Base Active time
Leadership impact on infectivity & active time
apparent Level of Mgt Interest
Impact of Leadership on wt
Leadership impact on implementation of New capability




**Simulating BT Success using the Systems Dynamic Model**

A series of sixteen simulations were run using ithink, in order to analyse the effect of adjusting the key variables in the model;

- Group size
- Activity
- Average path length
- Overall connectedness
- Leadership
- Quit rate of adopters

The results are presented by the following graph that depicts five typical time series representations of the model. The five simulations are:

1. Base case
2. Decrease in activity
3. Decrease activity and increased APL
4. Increased group size, decrease connectedness and decreased leadership
5. Increased activity, decreased APL and increased leadership.

These simulations are graphed on the flowing table, with each time series being numbered 1-5.

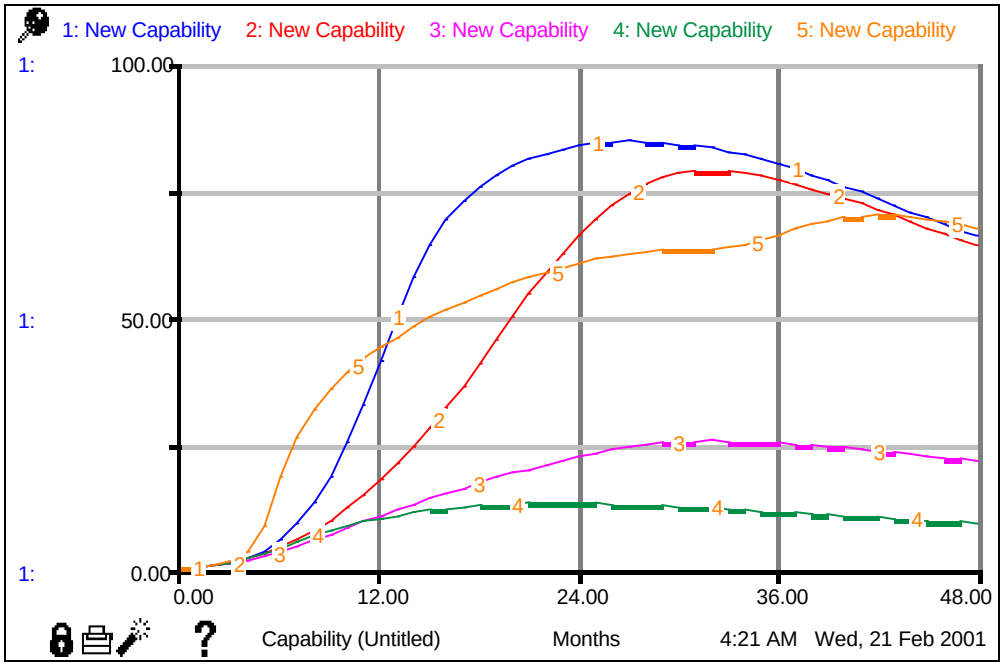
The results of these simulations are mapped against two success criteria, the implementation of the new capability and the time taken to implement. The area under the curve therefore represents the success of the BT project and can be quantified.

| Variable | Simulation 1 | Simulation 2 | Simulation 3 | Simulation 4 | Simulation 5 |
|---|---|---|---|---|---|
| ***Group Size*** | 50 | 50 | 50 | 100 | 50 |
| ***Activity*** | 200 | 100 | 100 | 200 | 300 |
| ***APL***[1] | 5 | 0 | 9 | 5 | 1 |
| ***Connectedness*** | 5 | 0 | 0 | 1 | 5 |
| ***Leadership*** | 5 | 0 | 0 | 1 | 10 |
| ***Quit %age p.a.*** | 10 | 0 | 0 | 1 | 10 |
| | | | | | |
| ***Success Measure***[2] | 1049 | 640 | 281 | 218 | 898 |

[1] Average Path Length
[2] Area under the curve

Other variables in the model held constant for all simulations;

- Base time to implement – 4 years
- Obsolescence rate per annum – 20%
- Base active time – 3
- Base word of mouth infectivity – 0.25
- Directive driven adoption fraction – 0.01
- Impact of communication on innovation - 0




The model highlights the following key dynamics:

1. If one factor is removed or set at zero, the innovation takes a lot longer to diffuse and successfully implement.

2. If two or more variables are removed or set at zero the innovation fails.

3. A saturation point for communication exists. Early take-up is experienced but at a certain level of activity, the success falls off.

**Conclusion**

Results from communication network analysis can be incorporated into a diffusion of innovation based system dynamics model for BT success. There is potential for the model to assist the understanding of the varying communication structures in place to support similar organisational change projects.

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Back to the Top