

Cross-Generational Knowledge Flows in Edge Organizations: Research in Progress

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ABSTRACT

As the graying workforce increases and the work patterns of our younger workers are more mobile, knowledge retention, attrition, and transfer become key determinants of the longevity of an organization. This is particularly true in edge organizations, which thrive on adaptability and agility to survive. In order for workforce development and succession planning to be effective in edge organizations, cross-generational knowledge flows are paramount towards achieving an innovative and agile organization. Very little research has looked at cross-generational knowledge flows, particularly in the context of edge organizations. The focus of the research in progress looks at: (1) examining how cross-generational knowledge flows affect edge organizations in terms of organizational effectiveness and organizational forms, and (2) developing and testing a model to enhance cross-generational knowledge flows in edge organizations.

1.0 Edge Organizations: Criteria for Success

Edge organizations allow individuals “at the edge” to be empowered. As such, edge organizations can take many forms. Certainly, terrorist cells are a type of edge organization where cells operate fairly autonomously, yet have an encompassing vision in mind. Other edge-like organizations may include jazz ensembles, soccer teams, open source development teams, small businesses, and university research teams. For our research, we are using our Spring 2007 semester MS-ITS (Master of Science-Information and Telecommunications Systems for Business) capstone teams at Johns Hopkins University to form our edge-like organizations for testing our cross-generational knowledge flow model. Each of these 4-5 member teams is multi-generational, and they

have a defined mission to complete within 15 weeks for the capstone clients (AARP, GAO, USDA, St. Joseph's Medical Center, HHS-Office on Disabilities, CBH Health, and Goodwill Industries of the Chesapeake Region). Some of these teams are working together on a collaborative project. Each team has a project leader. The teams are granted tremendous autonomy in getting the work done, and must employ a variety of business and IT specialties during the course of each project.

Nine of the key factors that comprise edge organizations include: Robustness, Interoperability, Competence, Agility, Shared Awareness, Decentralized Knowledge & Command, Situational Leadership, Pull & Smart, and Network-Centric Focus. In forming our cross-generational knowledge flow model on edge organizations, we will use nine key factors for edge organizations, tacit knowledge transfer, and cross-generational biases as the upper bound based on Miller's 7+/-2 model. Nine primary factors for an edge organization are highlighted below:

Interoperability: This is the ability to work together. Interoperability is synonymous to edge-type organizations which gives way to quality information sharing, collaboration, and self-synchronization. All this in turn dramatically increases mission effectiveness. The degree to which forces are interoperable directly affects their ability to conduct network-centric operations.

Agility: Edge organizations are agile. Agility allows available information to be combined in new ways, whereby a variety of perspectives are brought to bear, and the assets can be employed differently to meet the needs of a variety of situations. For this same reason, one of the factors of generation biases (i.e., the ability to deal with ambiguity and change) can be accommodated well by edge organizations. Edge organizations are particularly well suited to deal with uncertainty and unfamiliarity because they make more of the relevant knowledge, experience, and expertise available.

Shared Awareness: Shared awareness includes shared understanding of command intent. Power to edge is inherently a joint and coalition concept. Again the cross-generational biases--trust, reciprocity, motivation, values, and societal, organizational culture-- will have a great impact on the success of the edge organization. Furthermore, the size of each group in an edge organization will significantly influence the sharing of knowledge among them too. Google (Vise and Malseed, 2005), for example, has found the ideal project team size to be between 3 to 5 persons, dependent upon the scope of the effort.

Decentralized Knowledge and Command: An edge organization encourages appropriate interactions between and among any and all members. An edge organization is characterized by peer-to-peer relationships eliminating the middle management, and barriers to information sharing and collaboration are eliminated as well. Its approach to Command and Control (C2) breaks the traditional C2 mold by uncoupling Command and Control. Control is not a function of Command but an emergent property that is a function of the initial conditions, the environment, and the adversaries.

Situational Leadership: In edge organizations, leadership always emerges by sheer competence and not by position. In edge organizations, no single person will be in charge all the time. The person with greatest access to information will emerge as a leader in the edge organization. Once the mission is accomplished for which the said leader emerged, this position will disintegrate soon after and the individual will act as any other member of the team. An edge organization facilitates the act of synchronizing the intelligence, behavior, and capacity of all agents towards a common goal rather than having one traditional leader for all purposes.

Pull and Smart: The move from smart push (that exists in an hierarchical form of organizations) towards “post and smart pull” (a characteristic of an edge organization) would solve the intractable problems by identifying important information and getting it to the right persons. If the practice of post and smart pull can be implemented in an organization successfully, both the suppliers of the information and the consumers will become smarter.

Competence: An edge organization survives by competency rather than by any factor, be it gender, age, or years of experience. . If the competency level is high, the efficiency of an organization is less affected when people hoard information. The degree of competency of the agents in an edge organization will have a direct effect on how knowledge sharing achieves its purpose.

Robustness: Robustness is the hallmark of an edge organization. The ability of the agents to switch between tasks, especially when a particular task is completed, makes the edge organization quite robust.

Network-Centric Focus: Modern military environments are far too complex to be understood by any one individual, organization, or even military service. Modern information technology permits the rapid and effective sharing of information. Network-centric warfare/operations is a cornerstone of the ongoing transformation effort at the Department of Defense. An edge organization provides the necessary environment to nurture this effort. Edge organizations utilize information technology via a robust network to allow increased information sharing, collaboration, and shared situational awareness, which theoretically allows greater self-synchronization, speed of command, and mission effectiveness.

2.0 Tacit Knowledge Transfer

In most organizations, the difficult and most important type of knowledge to capture is the “tacit” knowledge that people have in their heads. According to Testa (2004), tacit knowledge is one of the most important drivers of innovation and change. For edge organizations to survive, the capture, transfer, and sharing of tacit knowledge, based on experiential learning, are key processes that must be embedded within the organization. Table 1 shows the leading studies that relate to tacit knowledge transfer. In studying this table, there is a convergence on nine factors that affect tacit knowledge transfer. These are: Trust, Organizational Culture, Societal Cultural Issues, Early

Involvement, Due Diligence, Reciprocity, Values, Motivation to Share Knowledge, and Intrinsic Worth of the Knowledge to be Conveyed. These tacit knowledge transfer characteristics will be integrated within our model.

Table 1: Tacit Knowledge Transfer

Factors	Citation	Study Description	Key Findings
Significant organizational resources; New environment; competitor actions; Educated guesses.	Brockmann & Anthony, 2002	Tacit knowledge plays an integral role in the context of strategic decision-making.	Tacit knowledge can be beneficial in helping define the context and fill in the missing gaps in strategic planning; Tacit knowledge employed overtly during strategy sessions would help make better decisions; Top management team replying on tacit knowledge while making decision.
Defensive (knowing what we know) vs. offensive (using what we know); Difficulty vs. de facto; Personalized vs. codifiable.	Connell et al., 2003	Views knowledge as a holistic system and advocates the use of knowledge models explicitly related to organizational context.	Transferability of knowledge is closely related to the potential separation of knowledge and knowledge carrier components; The success of a Knowledge Management Consultation System (KMCS) will depend on its components and their proper integration. There are six reasons why knowledge is likely to remain tacit: inefficiency, technology, motivation, language, internalizing, and externalizing.
Cognitive development; Behavioral change; Organizational learning; Trust.	Levin & Cross, 2004	Proposing and testing a model of two-party (dyadic) knowledge exchange for implications for theory and practice.	Benevolence- and competence-based trust mediates the link between strong ties and receipt of useful knowledge; Constant perceived trustworthiness dimensions uncover the benefit of weak ties to useful knowledge achievement of non-redundant information; Benevolence-based trust enhances both tacit and explicit knowledge exchange; Competence-based trust is especially important for the receipt of tacit knowledge.
Organizational culture; Organizational learning with internal and external transfer; Processes of donating and receiving; The issue of literary license of trust; The content of stories; The performance.	Connell et al., 2004	Narrative approaches contribute towards a better understanding of organizational knowledge management.	A storytelling culture through formal and informal mechanism should reflect organizational story-times and story-places.
Collaboration; Behavior of subsidiaries; Perspective of innovation and knowledge creation; Maintenance of differentiation and diversity within the multinational enterprises (MNEs)	Yamin & Otto, 2004	Examines the influence of inter-and intra-organizational knowledge flows on innovative performance in multinational enterprises.	Internal and external tacit/collaborative knowledge flows have a strong complementary influence on innovative performance; The influence of collaborative knowledge flows on innovative performance appears to be much stronger compared with that of informal knowledge flows.

Trust; Positive and negative recommendation.	Grandison & Sloman, 2003	Presents a description of architecture and basic use of the SULTAN Toolkit to specify, analyze, and monitor trust specifications for Internet applications.	The SULTAN system models the dynamic nature of a trust relationship through incorporation of the notions of experience; High-level trust specifications may also be refined to lower-level implementation policies about access control, authentication, and encryption.
Culture differences; Collaboration; Tacit Knowledge transfer challenges (difficult to articulate, diffuse, and integrate with existing knowledge inter-firm); Trust; Relational capabilities; Social capital; Differences in partner.	Collins & Hitt, 2006	Explains the importance of building relational capital and its role in transferring tacit knowledge in strategic alliances.	Leveraging tacit knowledge stocks in the development of competitive advantage within the context of strategic alliances is essential; Expertise and organization's performance are enhanced through knowledge transfer, which requires great attention to the relational dimension than explicit knowledge transfer.
Learning-by-doing; Face-to-face contact; Independent and Complementary knowledge exchange.	Aydogan & Lyon, 2004	The importance of complementary knowledge exchanges in the sustainability of knowledge-sharing coalitions.	Knowledge exchange may be in equilibrium if there is sufficient complementary knowledge in the exchange process; The organizational structure of the industry is an important determinant of whether knowledge exchange is viable.
Degree of collaboration; Technology innovation; Hyper-competition.	Johannessen et al., 2001	Analyzes the importance of tacit knowledge and its relationship with information technology	Knowledge strategies are essential; Organization needs to emphasize the total knowledge base as to achieve sustainable competitive advantage; Tacit knowledge, on its own, does not enhance innovation, only continuous improvements.
Narrative; Communities of Practices; Implicit learning (research on the phenomenon of acquiring tacit knowledge without intention or awareness).	Woo et al., 2004	Presents a coherent and practical way to use tacit knowledge in the Architecture, Engineering, and Construction (AEC) industry.	Tacit knowledge strategy seems more appropriate for the AEC industry; AEC professionals should emphasize tacit knowledge and use explicit knowledge in a supporting role; Knowledge bases should not reside in computerized repositories but in human brains.
Culture; Human aspects; Organizational trust; Cross-functional communication; Policy implementation.	Oltra, 2005	Aims to advance a simultaneously conceptual and practical framework that links human resource management (HRM) and knowledge management (KM)	Power distance can be turned into an obstacle for open communication, true involvement-winning contexts, transparency in the "rules of the game", and also inhibits employee perception of positive and exemplary behavior by management; Collectivism/Individualism – seems to be favorable to KM, since it promotes shared frameworks of reference and joint action toward common goals; Uncertainty avoidance – prevents creativity, pro-action and innovative attitudes, all of them key points for successful KM; Short-term/Long-term orientation – long-term orientation is better

			prepared for implementing “non quick fix” process-based strategies.
Alliance structure (enables the parties to coordinate joint work and align interests); Firm boundaries; External/Internal knowledge flows; Geographic boundaries; Technology diffusion.	Gomes-Casseres et al., 2005	Argues that knowledge flows between alliance partners will be greater than flows between pairs of non-allied firms, and less than flows between units within single firms.	Knowledge flows are greatest when the firms are close to each other along several dimensions: the alliance effect is greatest for technologically similar firms, firms in the same geographic region, and firms in the same industry; Large firms (as measured by sales) appear to share knowledge within alliances more than smaller firms; R&D-intensive firms seem to benefit more from alliance membership.
Dynamics of knowledge flows; Human capital flows; Retention intensity; Variation intensity.	Madsen et al., 2002	Investigates the relationships between the amount of human capital that flows into a firm and to activities underlying a firm’s knowledge production, variation or change and knowledge retention.	Knowledge retained in the past may restrict how much human capital a firm imports in the future; Inflows of human capital also tend to decline with recent experience with change.
Aging workforce (downsizing, shifting demographics, age homogeneity of the workforce itself); Workplace culture; Communication preference of the workers; Face-to-face human knowledge transfer; Collaboration; Risk avoidance and time constraint barriers to knowledge transfer.	Murphy, 2003	Workplace culture and the communication preferences of the workers profoundly affect the factors such as downsizing, shifting demographics and the age homogeneity of the workforce itself.	Within a medium sized civil service organization -- a decided preference existed for face to face human knowledge transfer even when other forms of well established explicit knowledge transfer conduits were available; A profound worker preference for training/knowledge sharing in work center or project team sized groups; Influences such as knowledge validity considerations, risk avoidance and time constrained barriers to knowledge transfer were explored but could not be correlated with such things as worker preferences for knowledge transfer conduit; Worker knowledge transfer preferences were evaluated relative to years of experience and department work assignment and no evidence could be found that these factors affected KT conduit preferences.
Culture; Intentionality; Degree of resistance of learning; Transfer knowledge barriers; Values; Trust; Behaviors.	Testa, 2004	Examines the role of knowledge transfer into intra-organizational and inter-organizational dimension.	Tacit knowledge is one of the most important drivers of innovation and change; The collective tacit knowledge resides in the top management.
Collective invention: participation and reputation.	Dahl & Pedersen, 2004	Examines the role of informal contacts by using a survey of individual engineers in Northern Denmark (NorCOM).	Informal contacts represent an important channel of knowledge diffusion.
Process of knowing; Language; Tradition (a system of values outside the individual).	Sveiby, 1996	Examines the concepts of tacit knowing and tradition; contrasts information theory to	The present growth in information seems to be a supply push, not a customer demand, which is potentially dangerous; Human

		explore the transfer of human knowledge on information.	knowledge is action oriented and is best transferred via tradition, in social interaction with people, because humans have a huge capacity to absorb signals unconsciously in face-to-face communication.
Cognitive flexibility (the ability to spontaneously restructure one's knowledge, in many ways, in adaptive response to radically changing situation demands); Concrete experience; Active experimentation; Abstract conceptualization; Reflective observation.	Wang , 2006	Enhances knowledge transfer through cognitive flexibility.	The change of conditions often creates major challenges of knowledge transfer; Knowledge worker's cognitive flexibility has a positive impact on knowledge transfer.
Application of knowledge over time; Across space; Difference users; New tasks/New contexts; Internal/External competition; Cognitive/Motivation barriers; Degree of centralization.	Chung, 2006	Explains why certain refinement designs lead to higher knowledge reusability.	To support codification as a critical KM strategy, repository systems must implement an effective knowledge refinement mechanism that optimizes the reusability of knowledge artifacts, and maximizes knowledge reuse; Knowledge reuse for replication: best practices and incorporate knowledge artifacts; Knowledge reuse for innovation: new ideas.
Facilitating/Inhibiting; Inter-organizational knowledge transfer; Organizational performance; Outcome-oriented performance (financial operational performance); Exclusively; Process-oriented performance (relational or structural performance).	Yang, 2006	Views of inter-organizational knowledge transfer (IOKT) in the context of upstream supply chain relationship from both buyer and supplier perspectives.	The concept of IOKT can be classified into the source/recipient type of knowledge transfer according to its bi-directional aspect; Practitioner should regard the IOKT as a future KM initiative for more comprehensive performance improvement; In order to improve organizational performance, which may result in a win-win situation for both sides of the supply chain, practitioners should understand the underlying mechanism of IOKT and try to keep an optimal balance between knowledge contribution and knowledge acquisition behaviors in addition to information charging.
Generalizing from self-determination; Autonomous extrinsic motivation (external motivators that have been internally regulated); Controlled extrinsic motivation.	Cockrell, 2006	Explores the motivational effects of incentives and knowledge culture on accountants' and other professionals' knowledge sharing behavior within professional services firms (PSFs).	Theoretical contributions include synthesizing economic and psychology-based theories of self-regulation to form a more complete model of knowledge sharing behavior; Pragmatic contributions include exploring the organizational conditions that promote functional and dysfunctional knowledge sharing in PSFs.
Motivation; Geographic; Temporal; Organizational/Cultural discontinuities; Coordination and communication	Wei, 2006	Bridges the gap between the literature in knowledge sharing, culture and literature on virtual teams.	Understanding the knowledge sharing activities in a virtual team environment is important to improve the team's effectiveness; managers have realized the

difficulties; Virtual teams vs. traditional face-to-face teams; Trust; Leadership; Culture differences.			importance of culture, they find it is difficult or even impossible to “articulate the culture-knowledge relationship in ways that lead to action”.
Trust; Early involvement; Due diligence.	Foos et al., 2006	Looks at some of the factors that influence the transfer of tacit knowledge between two product development partners.	Trust, early involvement and due diligence influence the extent of meeting technology transfer expectations and tacit knowledge transfer expectations.
Degree of collaboration; Organizational culture; Organization’s strategy; Manager’s effort.	Ilovici & Han, 2003	Describes some parameters of a knowledge organization and types of knowledge.	Tacit knowledge, existing primarily in the brains of people, would transfer slowly; Knowledge transfer model: $Q = P / R$

3.0 Cross-Generational Biases

In order to study cross-generational knowledge flows in edge organizations, we must examine the effects of cross-generational biases or inter-generational differences on tacit knowledge transfer. Table 2 shows the leading work in this area. In the United States, we can look at the various generations: war generation, baby boomers, Generation Xers, Generation Yers (also called Millennials or Nexters). The demographics in the United States show that many organizations, especially the government, will face human capital challenges as the baby boomers are nearing retirement age. Each generation also exhibits its share of biases. In an edge organization like a terrorist cell, the generational gaps may be compressed due to less variability in age among its members. Thus, this compounds the difficulty in analyzing cross-generational biases. However, in studying the literature, the following are the nine major factors affecting cross-generational biases: Loyalty, Making a Contribution, Work Values, Communications Styles, Gender, Culture, Ability to Deal with Ambiguity & Change, Autonomy & Independence, and Family Values.

Table 2: Cross-Generational Biases

Factors	Study Citation	Study Description	Key Findings
Loyalty Personal Ambition	Walker & Derrick, 2006	Comparison between senior employees & young employees in the US	Young generation: disloyal in their employers and tend to value their personal ambition; Older workers are dedicated to their service and employers.
Make a contribution Balance in life	Purdum, 2006	Aging workforce has manufacturers rethinking the roles of the boomer generation	Older workers want to work fewer hours but still have a meaningful job responsibility; Older workers want to make a contribution; They want a balance in life.
Knowledge vulnerability	ASTD, 2005	“Managing the Mature Workforce” report by The Conference Board	Identify potential gaps & knowledge transfer needs; broaden succession planning thinking; review training history; check communications mechanisms & messages for intergenerational approach; capitalize on affinity groups; build a retiree

			network; offer benefits of interest for mature workers.
Succession planning	Lau, 2006	Human Capital Talent Log of 375 names kept by Jardine Matheson, one of Hong Kong's biggest conglomerates, for succession planning purposes.	3M Hong Kong has had a succession plan since the early 1990s. It includes a minimum of one potential candidate for the top jobs at each of its 14 divisions.
Aging workforce	Thibodeau, 2006	Survey of 179 IT managers conducted by AFCOM, an association of data center managers	Nearly half the survey respondents said it takes at least 3 months to fill senior level technical and mgt positions
Work values Communications styles Attitudes towards technology	DiRomualdo, 2006	Based on a Society for HRM survey of generational issues in the workplace.	Work values, communications styles, and attitudes towards technology seem to be the major points of intergenerational friction. The younger the worker, the more sensitive they were to generational differences, both positive and negative. The more experienced the workers, the less aware they were of negative interactions between the generations in the workplace.
Rapport	Saxby, 2004	Rural telephone companies in the changing face of the future work force	Mirror and watch to build rapport; Create a dialogue with the customer; Speak your customer's language; Role-play; Show empathy; Measure customer satisfaction.
Values and Motivation	Aldisert, 1999	Generational distinctions	Matures: born in 1945 or earlier ("silent" generation); Baby boomers (1946-1965, "me" generation); Generation Xers (1966-1979, question anything that smacks of status quo); Generation Y/Nexters/Millennials (1980 or later).
Tacit knowledge transfer challenges: Difficult to articulate; Difficult to diffuse; Difficult to integrate with existing knowledge; Inter-firm differences; Cultural differences	Collins & Hitt, 2006	Building relational capital in organizations	Building relational capital involves development of trust, information sharing, and joint problem solving.
Propensity of the incumbent to step aside; Successor's willingness to take over; Gender.	Sambrook, 2005	Succession in small, growing firms in Wales.	Succession planning depends on the propensity of the incumbent to step aside, successor's willingness to take over, and gender (the planning and identification of female successors was lower than expected).
Culture	Lahaie, 2005	Interviews of senior executives in health care in Canada	Values→Corporate Culture→Corporate Memory→Corporate Knowledge→Knowledge must be managed→KM mitigates corporate memory loss
Stability; Attention to Detail; Loyalty; Thoroughness & Work Ethic;	Kidwell, 2003	Older works cope with continuous quality improvement	Veterans' (matures) strengths: stability, attention to detail, loyalty, thoroughness, work ethic; Matures' weaknesses: inability to deal with ambiguity and change, lack of

Ability to deal with ambiguity & change; Comfort with conflict; Challenge the system; Service & relationship orientation; Drive; Teamwork; Adaptability; Independence; Authority; Creativity; Sense of belonging; Freedom from supervision; Autonomy			comfort with conflict & reluctance to challenge the system. Baby boomer's strengths: service & relationship orientation, drive, ability to be team players. Boomers' weaknesses: self-centered, uncomfortable with conflict, and overly sensitive to feedback. Gen Xers are adaptable, independent, not intimidated by authority, & creative, but are impatient, inexperienced, and cynical. Gen Xers' important values: sense of belonging, teamwork, autonomy, security, and flexibility; Xers ranked freedom from supervision significantly higher than did boomers. Intergenerational research shows that managers who negatively stereotype generations do so at some peril.
Full Picture	Schiff, 2006	Resolving on-the-job frictions due to age differences	Gen Xers like to get the whole picture at the beginning of a project, rather than piecemeal during the job. Managers should establish their expectations early on.
Generational competence; Generational Diversity	Ceridian, 2005 Dominguez, 2003	The Conference Board survey of organizations	Assess the generational competence in organizations to determine how well the organization has adapted to meet the different needs of the 4 generations of workers; Conference Board found that 66% of orgs surveyed did not even have an age profile of their workforce; 81% of those orgs did not include cross-generational issues in their diversity training
Trust; Early involvement; Due diligence (collecting info to reduce the risk and uncertainty associated with a transaction)	Foos et al., 2006	Factors influencing tacit knowledge transfer between product development partners	Subject of tacit knowledge transfer, content and process, is poorly understood. Tacit knowledge is often learned via shared and collaborative experiences. Both trust and mutual understanding, developed in their social and cultural contexts, are prereqs for successful transfer of tacit knowledge.
Factors affecting knowledge flow rate: Degree of collaboration that exists within the org; degree to which an org's strategy relies on K transfer as a measure of success; manager's effort to pull info through the org; type of K being transferred (tacit K transfers slowly); the org layer through transfer occurs.	Ilovici and Han, 2003	Knowledge transfer model built on fluids.	$Q=P/R$ (Flow rate=Potentiality/Resistance)
Intentionality (transparency and receptivity of the involved subjects);	Testa, 2004	Views the importance of the knowledge transfer process.	Tacit knowledge is one of the most important drivers of innovation and change.

Value of the source unit's store of knowledge; Motivational disposition of the unit that are sources of knowledge; Existence and richness of the communication channels; Motivational disposition of the unit to whom knowledge is directed; Absorptive capacity or assimilation ability of the target unit; Transfer Barriers: Culture, Values, Attitudes, Behaviors			
Informal contacts	Dahl and Pedersen, 2004	Survey to engineers in Denmark.	Informal contacts represent an important channel of knowledge diffusion.
Harmony (unity with nature, world at peace); Embeddedness (social order, obedience, respect for tradition); Hierarchy (authority, humbleness); Mastery (ambition, daringness); Affective Autonomy (pleasure, exciting life); Intellectual Autonomy (broadmindedness, curiosity); Egalitarianism (social justice, equality)	Schwartz, 2004; Ester et al., 2006	200 samples from more than 65 nations	Values are carriers of culture that can be positioned in a multi-dimensional space. These are the 7 value dimensions.
Family Values	Scott and Braun, 2006	Data from the three waves of the European Values Study (1981, 1990, and 1999/2000) for France, West Germany, Great Britain, Netherlands, Ireland, Italy, Spain, Sweden, United States	Generational divide in Europe and the US with the "war generation" (Matures) being rather distinctive in its championing of traditional morality (marriage, motherhood, sexual values)
Work Values (Extrinsic: good pay, not too much pressure, good job security, good hours, generous holidays; Intrinsic: an opportunity to use initiative, a job in which you feel you can achieve something, a responsible job, a job that is interesting, a job that meets one's abilities)	Ester, Braun, and Vinken, 2006	European Values Study as the main data source: 3 waves.	The war generation and the boomers are less in favor of extrinsic work values than the GenXers, regardless of their employment or any other status. GenXers are more in favor of intrinsic work values, regardless of countries, time, gender, employment, or religious status.
Tolerance	Rother and Diez-Medrano, 2006	European Values Study as the main data source: 3 waves.	Youngest generation (GenXers) seem to be the most tolerant of various social groups compared with the war

			generation and boomers. Trends in overall tolerance show convergence is taking place across Western societies and that the process is still on-going, with younger generations being more tolerant than older ones.
Volunteering	Dekker and van den Broek, 2006	European Values Study as the main data source: 3 waves; 10 nations in Europe, and the U.S.	Trend towards higher percentages of populations reporting volunteering; No generational differences played a role in this trend.

4.0 Developing a Model for Cross-Generational Tacit Knowledge Flows in Edge Organizations

Taking the factors into account as explained in Sections 1 through 3, a model can be built for cross-generational tacit knowledge flows in edge organizations. Figure 1 shows the model to be used for our study. In the context of edge organizations, the cross-generational biases affect the tacit knowledge transfer between individuals or groups, which then affects the knowledge flow taking place. The MS-ITS capstone teams are used as our sample for testing the following hypotheses:

- H1: Cross-generational biases inhibit tacit knowledge transfer and decrease knowledge flows in edge organizations.
- H2: Strong work and family values will facilitate tacit knowledge transfer and increase knowledge flows in edge organizations
- H3: Decreased communications will inhibit tacit knowledge transfer and decrease knowledge flows in edge organizations.
- H4: Females act in a more collaborative manner than males, thereby increasing trust and tacit knowledge transfer resulting in an increase of knowledge flows in edge organizations.
- H5: A lack of interpersonal trust will result in reduced tacit knowledge transfer and decreased knowledge flows in edge organizations.
- H6: Informal networks will result in an increase in tacit knowledge transfer and increased knowledge flows in edge organizations.
- H7: Organizational and societal cultural barriers will decrease tacit knowledge transfer and decrease knowledge flows in edge organizations.
- H8: Motivation to share knowledge through being recognized and/or rewarded will increase tacit knowledge transfer and increase knowledge flows in edge organizations.
- H9: Reciprocity and the worthiness of the knowledge conveyed will stimulate tacit knowledge transfer and increase knowledge flows in edge organizations.
- H10: Increased loyalty will increase tacit knowledge transfer and increase knowledge flows in edge organizations.

To test the hypotheses, the survey in Figure 2 has been completed as a pre-test and post-test by the MS-ITS capstone teams to get perceptual measures. For more objective measures, each capstone team completes a weekly status report with questions responding to their knowledge flows and knowledge-based actions that have taken place

during the week. If knowledge enables action, then knowledge flows could be measured via the knowledge-based actions that they enable. Weekly observations, follow-up interviews, and statistical analysis of the surveys are being applied to shed light on cross-generational knowledge flows in these edge-like organizations.

Figure 2: Cross-Generational Knowledge Flow and Sharing Questionnaire

Developed by Dr. Jay Liebowitz and Nirmala Ayyavoo (Johns Hopkins University) and James Simien (NPRST)

A. What generation were you born?

- "War" generation (1945 or earlier)
- Baby boomers (1946-1965)
- Generation Xers (1966-1979)
- Generation Yers (1980 or later)

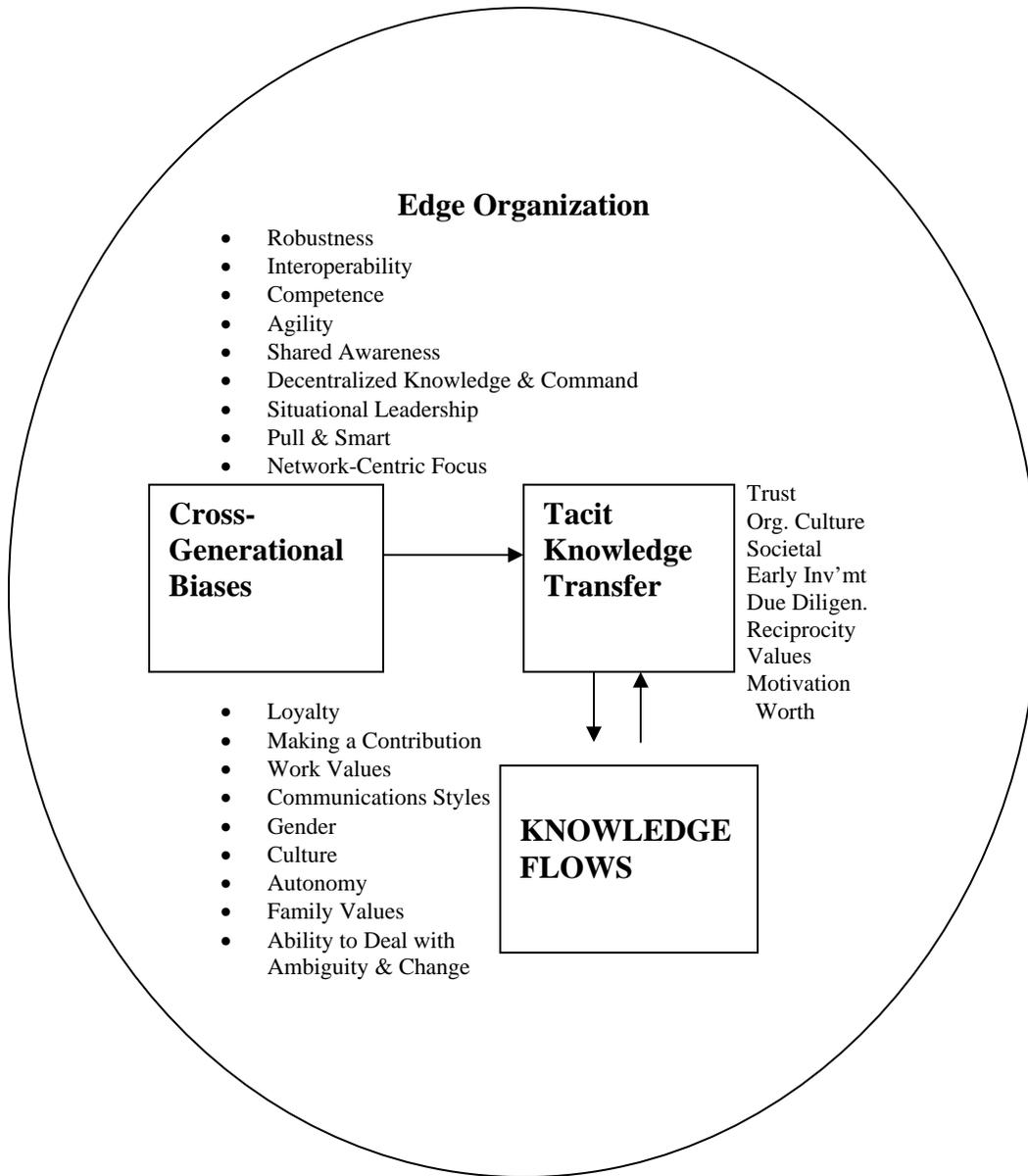
B. To what extent do you agree with the following statements?

Statement	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1. I expect the competency of the individuals on my capstone team to be high.					
2. Most of the knowledge that I will contribute to the capstone team will be from my life's experiences.					
3. I believe that there may be generational gaps on our team resulting in different expectations.					
4. I have dedicated work ethics.					
5. I have strong family values.					
6. I enjoy volunteering.					
7. I believe that the whole is greater than the sum of its parts.					
8. Most of the knowledge flows between my team members will be through codified means (e.g., use of Blackboard, reports, articles, email, etc.).					
9. I expect that the distribution of knowledge to appropriate individuals on my team will be done actively on a frequent basis.					
10. I have certain biases that my affect my performance on the team.					
11. I expect that our team's effectiveness will depend mostly on					

the knowledge flows between the capstone sponsor and our team.					
12. I know where to go to get the information that I need.					
13. The information that I need to make decisions is readily available.					
14. I feel that rotating leaders on project teams inhibits knowledge flows within the team.					
15. I am more collaborative than competitive.					
16. I am willing to share my knowledge with others because I feel they will reciprocate.					
17. I am loyal to the team's mission.					
18. I feel that the project leader should be more knowledgeable than the other team members.					
19. On my capstone team, I expect individual action to be highly valued.					
20. On my capstone team, people will be expected to stick to rules and procedures even when there are better solutions.					
21. I feel that I will be rewarded based upon my ability to share my knowledge with others.					
22. Knowledge is power.					
23. Sharing knowledge is power.					
24. I feel informal communications will foster trust and help better sharing of the knowledge in a group.					
25. I feel knowledge flows more easily when people of the same gender work as a team.					
26. Appreciation will motivate me to contribute better.					
27. Uncertainty and change can be better dealt with when the size of the group is smaller.					
28. By working together early on, I feel that this should lead to a					

successful project.					
29. My work and family commitments may constrain my efforts on this capstone.					

Figure 1: Model for Cross-Generational Tacit Knowledge Flows in Edge Organizations



5.0 Summary

This research on cross-generational knowledge flows in edge organizations should lead to new insights as to how tacit knowledge is transferred in edge organizations across generations. The research will be completed in October 2007, and should contribute to the command and control research program in the emerging area of edge organizations.

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