

1-1-1994

Correlation Survey: Results

J. Michael Moshell

Arthur Cortes

Find similar works at: <https://stars.library.ucf.edu/istlibrary>
University of Central Florida Libraries <http://library.ucf.edu>

This Research Report is brought to you for free and open access by the Digital Collections at STARS. It has been accepted for inclusion in Institute for Simulation and Training by an authorized administrator of STARS. For more information, please contact STARS@ucf.edu.

Recommended Citation

Moshell, J. Michael and Cortes, Arthur, "Correlation Survey: Results" (1994). *Institute for Simulation and Training*. 54.
<https://stars.library.ucf.edu/istlibrary/54>



INSTITUTE FOR SIMULATION AND TRAINING

CORRELATION SURVEY: RESULTS

Institute for Simulation & Training
University of Central Florida

18 August, 1994

IST Document : JMM94.58
J. Michael Moshell
Art Cortes



B322

Correlation Survey: Results

Institute for Simulation and Training
University of Central Florida

18 August 1994 - Document JMM94.58
J. Michael Moshell, Art Cortes

EXECUTIVE SUMMARY

This paper reports the results of an effort to survey the simulation community concerning research priorities concerning database correlation. The report discusses the background of the survey, statistical results and textual comments received as part of the survey, and then offers some conclusions.

On the basis of this survey, the following research questions are recommended for initial investigation:

- 2.2 - Miscorrelated intervisibility ("I see you, you ^{Don't?} see me.")
- 2.3 - Miscorrelated target visibility ("I see target, you don't.")
- 2.4 - Miscorrel. target appearance ("I see T72, you see M1A1")
- 2.18- Runtime Terrain vertical miscorrel. ("DB1:320m, DB2:330m.")
- 2.19- Runtime Terrain lateral miscorrel. ("DB1: Peak here;
DB2: there.")
- 2.24- Source DB lateral miscorrel. ("DB1: Peak here; DB2: there.")
- 2.23- Miscorrelation in culture attributes

The questions are fully stated and the taxonomy within which they are defined is explained in the original Survey form (Appendix A to this Report.) The reasoning behind this recommendation is explained in Section 5 (Conclusions.)

1. Background

The issue of database correlation is a central one for distributed interactive simulation. In May of 1994, and June of 1994, we designed a questionnaire to gather opinions within the simulation community concerning research priorities in this area. This survey was extensively edited and revised with the assistance of Ken Oda, Mike Sieverding and Ken Hardis, and distributed to approximately fifty recognized experts in simulation.

After two months of repeated effort and multiple telephone calls to each person, we had received thirteen replies. As this is the second attempt to conduct such a survey, we have concluded that this is likely to be the extent of our success. There are probably two reasons for this low response rate:

- 1) The subject is inherently very difficult to formalize. Many people remarked that the answer to almost every question is "it depends on the application." But since there are dozens of applications, we have to average across them.
- 2) Substantial effort went into trying to create a taxonomic framework, but this framework in turn led to the creation of fifty questions, each with two answers required (significance, and ease of measurement or implementation.) Perhaps this large list of questions reduced subjects' willingness to answer.

2. Statistical Results.

We computed the mean scores and standard deviations (where 1=A="Critical" and 5=E="Irrelevant") for each of the 50 questions, then sorted according to mean scores. Questions in groups 2 and 3 concern research priorities, and so are sorted together. Questions in group 4 concerned technical or political steps to be considered for the improvement of correlation, and so were separately sorted. The results are shown in fold-out Charts 1 and 2.

Research Questions. The ten most critical research issues were as follows:

Mean Question

- | | | |
|------|------|---|
| 1.23 | 2.2 | - Miscorrelated intervisibility ("I see you, you see me.") |
| 1.65 | 2.3 | - Miscorrelated target visibility ("I see target, you don't.") |
| 1.65 | 2.4 | - Miscorrel. target appearance ("I see T72, you see M1A1") |
| 1.73 | 2.18 | - Runtime Terrain vertical miscorrel.
("DB1:320m, DB2:330m.") |
| 1.73 | 2.19 | - Runtime Terrain lateral miscorrel.
("DB1: Peak here; DB2: there.") |
| 1.82 | 2.24 | - Source DB lateral miscorrel.
("DB1: Peak here; DB2: there.") |

- 1.83 3.4 - Effect of terrain DB miscorrel. on behavioral miscorrel.
- 1.85 2.7 - Miscorrelation in performance measures
- 1.91 2.25- Miscorrelation in culture content
- 2.0 2.23- Miscorrelation in culture attributes

Since a score of 1.0 corresponds to "Critical" and 2.0 corresponds to "Very Important", these ten questions were highly significant to the respondents. In addition, five more questions scored between 2.0 and 2.05. The least significant ten research questions (out of 37) scored between 2.7 and 3.5, which would correspond to "somewhat important."

Reliability of Research Questions. As a means of estimating the reliability of these responses, we next sorted by standard deviation to see how much agreement there was on the scores. The most reliable 1/4 of the questions had standard deviations less than 0.8. Our seven highest ranked questions (except for 2.18) fell into this group. Thus we can say with some confidence that these top-ten (and particularly top-seven) research items represent a consensus recommendation. This can be verified by scanning the columns of data in Chart 1.

Policy Questions. There were thirteen policy questions in section 4. The five top scoring questions were:

Mean Question

- 1.23 4.6 - Agreement on a common version of the DIS protocols
- 1.46 4.1 - Agreement on a common source database
- 1.69 4.4 - Agreement on a common spatial coordinate system
- 2.15 4.3 -Restrictions on system-specific filtering/enhancing of a
common source database.
- 2.15 4.7 - Agreement on common coord. transform. algorithms

Within section 4, the median standard deviation was 1.07. All these top scoring questions' standard deviations were at or below this value. Thus (with somewhat less unanimity than on the research questions) we can see that the respondents agreed on the priority of these concerns.

Difficulty of Measurement. The scores for difficulty of measurement were sorted in a manner analogous to Chart 1's

treatment of the research questions. The rankings within this list of the top-ten research questions is as follows:

Question	Difficulty	Rank
2.2	3.08	27
2.3	2.77	19
2.4	2.54	14
2.18	2.25	8
2.19	2.58	18
2.24	2.2	6
3.4	3.45	34
2.7	2.91	21
2.25	2.5	13
2.23	1.8	1

From this chart we see that the three highest-priority research questions (2.2, 2.3 and 2.4) were evaluated as relatively difficult to measure. The first, in fact, was ranked 27th of the 36 (where 36/36 was judged the most difficult.) On the other hand, two of the second group of five questions were regarded as quite easy to measure. These observations are used in Section 6 to make specific recommendations concerning initial research to conduct.

No analysis of the standard deviations of the difficulty-of-measurement questions was conducted, though this data was automatically sorted by the spreadsheet in the bottom half of Chart 3.

Difficulty of Implementation. Chart 4 shows the sorted scores for the questions in section 4 that concerned the difficulty of implementation of actions. The five regarded as least difficult were

- 4.12 - Restrictions on which simulators can play in each DIS exercise.
- 4.8 - Agreement on a common dead reckoning algorithm.
- 4.7 - Agreement on common coordinate transformation algorithms.
- 4.13- Restriction on the freedom of movement of each player.
- 4.4 - Agreement on a common spatial coordinate system.

Several respondents did not answer this section. In any case, all the answers (unlike the estimates of difficulty of measurement) relate as much to political as to technical issues. Therefore this section plays no part in the recommendations we make based on this survey.

3. Textual Comments

Question Group 1: Historical Events and Background.

In this section, we only report the relevant responses (i. e. those in which correlation issues arose.) This sometimes involved merging the reports of two or more participants in that event; but if answers differ substantially, the reports are kept separate. The full set of original data is available to interested readers.

I/ITSEC DIS Interoperability demos, 92-94.

Scott Smith, Mikel Petty:

Was correlation a goal? No.

Correlation anomalies observed: Terrain elevation, orientation, different interpretation of bounding volumes, appearances.

Effects: Variable behavior.

Remedies: Ad hoc adjustments to Z values for entities; not very effective. Scenario was

Documentation: 1992 Simulator Networking Handbooks; 1993 I/ITSEC Interop Demo Report.

Ken Oda; Farid Mamaghani,:

Was correlation a goal? Yes, in 1993. In 1992 it was fuzzy.

Correlation anomalies observed: Many. Tanks floating in air or burrowing underground, road mismatches. Herky-jerky motion of air vehicles. Mismatch terrain geometries; errors in network protocols.

Effect: Public demo scenarios were severely restricted to minimize visible anomalies.

Remedies: In 1993, players were asked to match terrain polygons in source data base. Those who did so appeared to

Aircraft, sensor platforms and ground vehicles. Tactical missile defense, close air support. 92,93, 94. Herb Bell (Armstrong Lab).

Anomalies: terrain elevation, feature location, vehicle placement, target detectability, coordinate conversion.

Effects on outcome: Minor.

Remedies: Scenario management, terrain clamping, modification of databases.

Documentation: War Breaker Lessons Learned (ARPA.)

PT2000, SGI(VRLink), IST SAFOR & MODSAF. I/ITSEC Compliance. 1993-94. Eytan Pollack (Martin Marietta).

Anomalies: Different models, terrain.

Effect: Important targets are not always shown (to prevent overload.)

Remedies: Manage Model LODs based on predicted processing load and prioritizing models.

Documentation: "Interoperability of Dissimilar Visual Systems, a Prototype DIS Scene Manager." Report delivered to IST, March 1994. Final report, June 94.

Warbreaker: SAF, Air, Land, near-ground etc. 1992-94. Farid Mamaghani.

Anomalies, effects, remedies: Contact IDA for specifics.

Dismounted Infantry Demo: SAF, Land, Janus and Live. Ft. Benning, Feb. 1994. Farid Mamaghani.

Anomalies: Mismatches between live and virtual terrain geometries; problems with differences between SIMNET and DIS protocols; differences in individual simulator calculation of control inputs and motion dynamics, and dead reckoning differences.

Research Questions

Sorted by	2	2	2	2	2	2	3	2	2	2	3
IMPORTANCE	2	3	4	18	19	24	4	7	25	23	1
Abascal, Robert	2	2	3	3	3	3	2	2	3	3	1
Bell, Herb	2	3	2	4	2	2	2	2	4	4	3
Burns, Jimmy	1	2		2	2		2	1			2
Hardis, Ken	1	1	2	2	2	2	3	2	2	2	3
Mamaghani, Farid	1	1	2	2	2	2	1	1	2	2	2
Mccarter, Steve	1	1.5	1	1.5	1.5	3		1	3	4	
McWhorter	2	3	3	1	2		2	4			2
Moore, Ronald	1	1	1	1	2	2	1	1	1	1	2
Oda, Ken	1	1	2	1	1	1	1	3	1	1	2
Panzitta, Mike	1	2	1	1	1	1	3	1	1	1	2
Petty, Mikel	1	2	1	1	1	1	2	3	1	1	2
Pollack, Eytan	1	1	1	2	2	2	2	2	2	2	2
Smith, Scott	1	1	1	1	1	1	1	1	1	1	1

Mean	1.23	1.65	1.67	1.73	1.73	1.82	1.83	1.85	1.91	2	2
Std. Dev	0.44	0.75	0.78	0.93	0.6	0.75	0.72	0.99	1.04	1.18	0.6

Research Questions

Sorted by	2	2	3	3	3	3	3	2	2	2	3
RELIABILITY	2	19	1	2	9	4	3	3	24	1	10
Abascal, Robert	2	3	1	3	3	2	3	2	3	4	3
Bell, Herb	2	2	3	3	3	2	3	3	2	2	3
Burns, Jimmy	1	2	2	2		2	2	2		3	
Hardis, Ken	1	2	3	2	2	3	3	1	2	2	2
Mamaghani, Farid	1	2	2	1	3	1	2	1	2	2	1
Mccarter, Steve	1	1.5						1.5	3	1	
McWhorter	2	2	2	2	2	2	1	3		2	3
Moore, Ronald	1	2	2	3	2	1	2	1	2	2	2
Oda, Ken	1	1	2	2	1	1	1	1	1	2	1
Panzitta, Mike	1	1	2	2	2	3	2	2	1	2	2
Petty, Mikel	1	1	2	2	2	2	2	2	1	2	2
Pollack, Eytan	1	2	2	2	2	2	2	1	2	2	2
Smith, Scott	1	1	1	1	1	1	1	1	1	1	1

Mean	1.23	1.73	2	2.08	2.09	1.83	2	1.65	1.82	2.08	2
Std. Dev	0.44	0.6	0.6	0.67	0.7	0.72	0.74	0.75	0.75	0.76	0.77

3	3	3	2	2	2	3	3	3	2	2	3	2	2	2
3	6	10	20	1	6	2	9	8	26	27	5	22	14	21
3	3	3	3	4	4	3	3	4	3	3	3	4	2	4
3	2	3	4	2	3	3	3	3	4	4	3	4	3	4
2	2			3	2	2		2			2		2	2
3	3	2	2	2	2	2	2	2	2	2	3	2	2	2
2	1	1	2	2	1	1	3	1	2	1	3	1	2	2
			2.5	1	3				4	4		3	3	3.5
1	2	3	3	2	1	2	2	3			2	4	3	4
2	1	2	1	2	1	3	2	3	2	2	3	2	2	2
1	1	1	1	2	1	2	1	2	2	3	1	3	4	2
2	3	2	2	2	1	2	2	2	1	2	3	2	1	2
2	2	2	1	2	3	2	2	2	2	2	2	2	2	2
2	3	2	2	2	3	2	2	2	3	2	3	2	3	3
1	1	1	1	1	2	1	1	2	1	1	1	1	4	1

2	2	2	2.04	2.08	2.08	2.08	2.09	2.33	2.36	2.36	2.42	2.5	2.54	2.58
0.74	0.85	0.77	0.96	0.76	1.04	0.67	0.7	0.78	1.03	1.03	0.79	1.09	0.88	1

2	3	3	3	3	2	2	2	2	2	2	2	2	2	2
4	8	5	7	6	14	10	5	11	18	16	20	7	12	21
3	4	3	4	3	2	4	4	4	3	3	3	2	3	4
2	3	3	4	2	3	5		4	4	3	4	2	4	4
	2	2		2	2	4	3		2	4		1	2	2
2	2	3	2	3	2	2	3	2	2	2	2	2	2	2
2	1	3	3	1	2	3	2	3	2	4	2	1	3	2
1				3	3	1	2	1.5	4	2.5	1	3	3.5	
3	3	2	3	2	3	4	3	2	1	3	3	4	3	4
1	3	3	3	1	2	3	2	2	1	2	1	1	1	2
2	2	1	2	1	4	4	3	3	1	4	1	3	3	2
1	2	3	2	3	1	3	2	2	1	2	2	1	2	2
1	2	2	2	2	2	4	2	4	1	3	1	3	3	2
1	2	3	2	3	3	2	3	3	2	3	2	2	3	3
1	2	1	2	1	4	4	4	4	1	5	1	1	5	1

1.67	2.33	2.42	2.64	2	2.54	3.46	2.67	2.92	1.73	3.23	2.04	1.85	2.85	2.58
0.78	0.78	0.79	0.81	0.85	0.88	0.88	0.89	0.9	0.93	0.93	0.96	0.99	0.99	1

3	2	2	2	2	2	2	2	2	2	2	2	2	2	2
7	5	12	11	8	13	17	9	16	10	11				
4	4	3	4	4	3	3	4	3	4	4	4	4	4	4
4		4	4	4	3	3	5	3	5	5	5	5	5	5
	3	2			3	3	4	4	4	4	4	4	4	4
2	3	2	2	2	2	2	2	2	2	2	2	2	2	2
3	2	3	3	3	2	3	3	4	3	2				
	1	3	2	3.5	1.5	4	4	4	3	4				
3	3	3	2	2	3	4	1	3	4	3				
3	2	1	2	1	4	1	2	2	3	2				
2	3	3	3	3	5	4	4	4	4	4	4	4	4	4
2	2	2	2	3	2	2	2	2	2	3	2	2	2	2
2	2	3	4	4	4	4	4	4	3	4	4	4	4	4
2	3	3	3	2	2	2	3	3	2	3				
2	4	5	4	4	4	5	4	5	4	5	4	5	4	5

2.64	2.67	2.85	2.92	2.96	2.96	3.08	3.23	3.23	3.46	3.54				
0.81	0.89	0.99	0.9	1.01	1.05	1.12	1.17	0.93	0.88	1.2				

2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
8	26	27	6	25	13	22	17	9	23	15				
4	3	3	4	3	3	4	3	4	3	4	3	4	3	4
4	4	4	3	4	3	4	3	5	4	5	4	5	4	5
		2		3		3	4		3					
2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
3	2	1	1	2	2	1	3	3	2	2				
3.5	4	4	3	3	1.5	3	4	4	4	4	4	4	4	4
2		1		3	4	4	1		3					
1	2	2	1	1	4	2	1	2	1	2	1	2	1	2
3	2	3	1	1	5	3	4	4	1	5	1	5	1	5
3	1	2	1	1	2	2	2	2	2	1	2	1	2	1
4	2	2	3	1	4	2	4	4	1	5	1	5	1	5
2	3	2	3	2	2	2	2	3	2	3	2	3	2	3
4	1	1	2	1	4	1	5	4	1	5	4	1	5	4

2.96	2.36	2.36	2.08	1.91	2.96	2.5	3.08	3.23	2	3.54				
1.01	1.03	1.03	1.04	1.04	1.05	1.09	1.12	1.17	1.18	1.2				

CHAPTER 2

IST - 1994 Survey on Database Correlation -													
Policy													
Questions	4	4	4	4	4	4	4	4	4	4	4	4	4
Sorted by	6	1	4	3	7	8	2	9	5	12	13	11	10
IMPORTANCE													
	1	2	2	4	2	4	4	4	2	4	4	4	4
	1	2	2	3	1	2	4	5	4	1	5	5	5
	1	1	3	2	2	2		2	3		2		
	1	1	1	2	1	1	2	1	2	5	3	2	3
	1	2	2	2	3	2	4	2	4	3	4	4	4
	2	1	4	1	1	2	1	3	4	4	2	4	4
	2	1	1	1	2	2	2	3	1	2	4	3	3
	1	1	1	1	3	3	3	2	3	3	4	4	4
	1	1	2	1	2	2	4	1	4	2	3	3	2
	2	2	1	2	2	2	1	2	5	3	4	2	2
	1	1	1	2	1	3	1	4	1	5	4		
	1	3	1	4	4	2	4	3	1	4	4	4	4
	1	1	1	3	4	4	1	5	4	4	2	4	5
	1.23	1.46	1.69	2.15	2.15	2.38	2.58	2.85	2.92	3.33	3.46	3.55	3.64
	0.44	0.66	0.95	1.07	1.07	0.87	1.38	1.34	1.38	1.23	0.97	0.93	1.03
Policy													
Questions	4	4	4	4	4	4	4	4	4	4	4	4	4
Sorted by	6	1	8	11	4	13	10	3	7	12	9	2	5
RELIABILITY													
	1	2	4	4	2	4	4	4	2	4	4	4	2
	1	2	2	5	2	5	5	3	1	1	5	4	4
	1	1	2		3	2		2	2		2		3
	1	1	1	2	1	3	3	2	1	5	1	2	2
	1	2	2	4	2	4	4	2	3	3	2	4	4
	2	1	2	4	4	2	4	1	1	4	3	1	4
	2	1	2	3	1	4	3	1	2	2	3	2	1
	1	1	3	4	1	4	4	1	3	3	2	3	3
	1	1	2	3	2	3	2	1	2	2	1	4	4
	2	2	2	2	1	4	2	2	2	3	2	1	5
	1	1	3		1	4		2	1	5	4	1	1
	1	3	2	4	1	4	4	4	4	4	3	4	1
	1	1	4	4	1	2	5	3	4	4	5	1	4
	1.23	1.46	2.38	3.55	1.69	3.46	3.64	2.15	2.15	3.33	2.85	2.58	2.92
	0.44	0.66	0.87	0.93	0.95	0.97	1.03	1.07	1.07	1.23	1.34	1.38	1.38

IST - 1994 Survey on Database Correlation -																																															
Research Questions																																															
Sorted by	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	3	3	3	2	3	2	2	3	3	3	3	3	3											
MEASUREMENT	23	1	13	10	22	24	27	18	6	20	21	5	25	26	4	16	17	14	19	3	9	7	11	15	3	5	7	2	1	12	8	6	8	9	4	10	2										
Abascal, Robert	2	2	2	2	2	2	2	2	2	2	2	2	2	2	3	2	2	2	2	3	2	3	2	3	2	2	2	3	1	2	3	2	2	2	3	2	2										
Bell, Herb	3	2	2	2	2	2	2	3	3	5	4		5	4	1	2	3	2	2	3	2	4	3	3	3	3	3	2	4	4	4	4	5	5	5	5	5										
Burns, Jimmy		2	2	2				4	2						4	2	2	2	4	2	3				2			4		4																	
Hardis, Ken	2	2	2	3	3	3	3	2	3	3	3	3	3	3	2	4	4	4	4	3	3	2	4	4	4	3	3	4	3	4	4	3	3	4	4	3	4										
Mamaghani, Farid	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	2	2	1	1	1	3	2	2	2	2	2	2	2	1	2	2	2	2	2	2	2	2										
Mocarter, Steve	2														3					2	3							3																			
McWhorter		2	3	2	2			3	4	2	2	2		3	2	2	3	3	3	4	1	2	3	4	4	3	3	4	3	4	4	4	3	3	4	3	4										
Moore, Ronald	2	2	1	2	2	2	2	2	2	2	2	3	2	2	4	3	3	4	2	4	5	4	4	3	3	3	3	4	3	4	4	4	4	4	4	4	4										
Oda, Ken	2	2	2	2	2	3	2	2	3	3	2	3	3	2	2	2	2	2	3	3	2	2	2	3	4	4	4	3	4	2	3	3	3	4	3	3	3										
Panzitta, Mike	2	2	2	1	3	3	3	2	2	2	3	2	2	3	2	2	3	3	3	3	3	3	3	3	2	2	3	4	3	2	3	3	4	3	3	4	4										
Petty, Mikel	1	2	2	2	2	1	2	1	2	1	2	3	1	2	1	3	2	2	1	3	2	2	2	3	3	3	3	3	3	3	3	3	3	3	3	3	3										
Pollack, Eytan	2	2	3	3	4	4	4	2	2	4	4	3	4	4	3	4	4	2	4	3	3	3	4	4	3	3	3	4	3	4	3	4	4	3	4	4	4										
Smith, Scott	1	1	2	2	1	1	1	3	2	2	2	3	2	2	4			4	3	3	3	4	4		4	4	3	3		4	3	4	4	4	4	4											
Mean	1.8	1.85	2	2.08	2.18	2.2	2.2	2.25	2.33	2.45	2.45	2.5	2.5	2.5	2.54	2.55	2.55	2.58	2.58	2.77	2.85	2.91	2.91	3	3	3	3	3.08	3.1	3.17	3.26	3.36	3.36	3.36	3.45	3.45	3.5										
Std. Dev	0.63	0.38	0.6	0.51	0.87	1.03	0.92	0.87	0.78	1.21	0.93	0.71	1.27	0.97	1.13	0.82	0.82	1	1	0.73	0.9	1.04	0.94	0.63	0.77	0.77	0.63	0.86	0.99	0.94	0.62	0.92	0.92	0.92	0.82	0.93	0.97										
Research Questions																																															
Sorted by	2	2	2	2	2	3	2	2	2	3	3	2	3	2	2	2	2	2	2	3	3	3	3	2	2	2	2	3	3	2	2	2	2	2	2	2											
RELIABILITY	1	10	13	8	15	7	23	5	3	3	5	6	4	16	17	2	18	22	9	27	8	8	9	10	21	12	11	26	2	1	14	19	24	7	4	20	25										
Abascal, Robert	2	2	2	3	3	2	2	2	3	2	2	2	3	2	3	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1	2	2	2	3	3	2	2										
Bell, Herb	2	2	2	4	3	3	3		3	3	3	3	5	2	3	2	3	2	2	2	5	5	5	5	4	4	3	4	5	4	2	2	2	4	1	5	5										
Burns, Jimmy	2	2	2		2				2			2		2	2	4	4		3							4					2	4			4												
Hardis, Ken	2	3	2	3	4	4	2	3	3	3	3	3	3	4	4	3	2	3	2	3	3	4	4	4	3	4	4	3	4	4	4	3	3	4	2	3	3										
Mamaghani, Farid	1	2	1	2	2	2	1	1	1	2	2	1	2	2	2	1	1	1	3	1	2	2	2	2	1	2	2	1	2	2	1	1	1	2	1	1	1										
Mocarter, Steve	2			4												3			3																	3											
McWhorter	2	2	3	4	3	3		2	3	4	4	4	4	2	2	3	3	2	4		4	3	3	3	2	3	2		4	4	3	3		1	3	2											
Moore, Ronald	2	2	1	4	3	3	2	3	4	3	3	2	4	3	3	4	2	2	5	2	4	4	4	4	2	4	4	2	4	3	4	2	2	4	4	2	2										
Oda, Ken	2	2	2	3	3	4	2	3	3	4	4	3	3	2	2	3	2	2	2	2	3	3	4	3	2	2	2	2	3	4	2	3	3	2	2	3	3										
Panzitta, Mike	2	1	2	3	3	3	2	2	3	2	2	2	3	2	2	4	2	3	3	3	3	4	3	4	3	2	3	3	4	3	3	3	3	3	2	2	2										
Petty, Mikel	2	2	2	3	3	3	1	3	3	3	3	2	3	3	2	3	1	2	2	2	3	3	3	3	2	3	2	2	3	3	2	1	1	2	1	1	1										
Pollack, Eytan	2	3	3	3	4	3	2	3	3	3	3	2	4	4	4	4	2	4	3	4	4	4	3	4	4	4	4	4	4	3	2	4	4	3	3	4	4										
Smith, Scott	1	2	2	3		3	1	3	3	4	4	2	4		3	3	1	3	1	4	3	4	4	2	4		4	2			4	3	1	4	4	2	2										
Mean	1.85	2.08	2	3.25	3	3	1.8	2.5	2.77	3	3	2.33	3.45	2.55	2.55	3.08	2.25	2.18	2.55	2.2	3.36	3.36	3.36	3.45	2.45	3.17	2.91	2.5	3.5	3.1	2.58	2.58	2.2	2.91	2.54	2.45	2.5										
Std. Dev	0.38	0.51	0.6	0.62	0.63	0.53	0.63	0.71	0.73	0.77	0.77	0.78	0.82	0.82	0.82	0.85	0.87	0.87	0.9	0.92	0.92	0.92	0.92	0.93	0.93	0.94	0.94	0.97	0.97	0.99	1	1	1.03	1.04	1.13	1.21	1.27										

CHART 4

IST - 1994 Survey on Database Correlation -													
Policy													
Questions	4	4	4	4	4	4	4	4	4	4	4	4	4
Sorted by	12	8	7	13	4	1	6	2	5	3	9	10	11
IMPLE-													
ENTATION	2	2	1	2	2	3	3	3	2	3	2	2	2
	1	3	3	5	3	1	4	1	3	2	4	4	5
						4				3			
		3	2	3	3	3	3	4	4	3	4	4	4
	2	2	3	2	3	2	2	4	4	3	3	2	2
	1	2	2	1	1	2	2	2	1	5	5	5	5
	3	2	2	2	4	3	2	3	2	3	4	3	3
	1	2	3	2	3	2	2	2	3	4	4	4	4
	4	3	4	3	3	3	3	3	4	4	4	4	4
	1	3	2	1	2	3	2	3	3	3	2		
	2	2	2	3	2	3	2	4	2	4	4	4	4
	1	1	2	2	1	2	4	2	4	3	3	4	4
	1.8	2.27	2.36	2.36	2.45	2.58	2.64	2.82	2.91	3.33	3.55	3.6	3.7
	1.03	0.65	0.81	1.12	0.93	0.79	0.81	0.98	1.04	0.78	0.93	0.97	1.06
Policy													
Questions	4	4	4	4	4	4	4	4	4	4	4	4	4
Sorted by	8	3	1	6	7	9	4	10	2	12	5	11	13
RELIA-													
BILITY	2	3	3	3	1	2	2	2	3	2	2	2	2
	3	2	1	4	3	4	3	4	1	1	3	5	5
		3	4										
	3	3	3	3	2	4	3	4	4		4	4	3
	2	3	2	2	3	3	3	2	4	2	4	2	2
	2	5	2	2	2	5	1	5	2	1	1	5	1
	2	3	3	2	2	4	4	3	3	3	2	3	2
	2	4	2	2	3	4	3	4	2	1	3	4	2
	3	4	3	3	4	4	3	4	3	4	4	4	3
	3	3	3	2	2	2	2		3	1	3		1
	2	4	3	2	2	4	2	4	4	2	2	4	3
	1	3	2	4	2	3	1	4	2	1	4	4	2
	2.27	3.33	2.58	2.64	2.36	3.55	2.45	3.6	2.82	1.8	2.91	3.7	2.36
	0.65	0.78	0.79	0.81	0.81	0.93	0.93	0.97	0.98	1.03	1.04	1.06	1.12

