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AD-A222 124

MEMORANDUM FOR Marketing and Publication

SUBJECT: Certification and Transmittal of Final Manuscript

1. The enclosed final manuscript is submitted.

   a. Title: Analysis of Decision Conferences (DC)

   b. First author: K. J. Chun

   c. Contributing author(s): P.C. Humphreys & L.D. Phillips

   d. Field unit/tech area:

   e. Present FU/TA/HQ office chief:

   f. Project name:

2. Checklist has been completed.

3. It is to be published as a: Research Note

4. The DoD Distribution statement is: Approved for Public Release; Distribution Unlimited

5. First-time-distribution list requested is:
   Additional author copies requested: 5 .

6 Encls
1. Package checklist
2. Peer review - 1
3. Report documentation page (DD Form 1473)
4. Table of contents
5. Body of the manuscript
6. Reference list

MICHAEL KAPLAN
Director, Basic Research

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**PEER REVIEW**
**(Subject matter expert review)**

**Date Due:** _____
**Date Received:** 10/30/89
**Date Returned:** _____

**Reviewer (full name)** Michael Kaplan
**Organization** Office of Basic Research

**Manuscript Title** Analysis of Decision Conferences: The impact of the group's cognitive processes in problem recognition stage on their problem formulation.

**Author or COR** Milton Katz / Michael Kaplan

**I. RATINGS (extent to which criteria are met):**

A. FOREWORD, EXECUTIVE SUMMARY (BRIEF): Are they clear? Are they consistent with the contents? Are they directed to target readers or users? Do they concisely highlight the important findings?

No_ Moderately_ Yes_ Substantially_

B. INTRODUCTION, BACKGROUND, OBJECTIVES: Is the literature review relevant to the research conducted (necessary and sufficient)? Is the statement of the problem pertinent to the target audience? Is it clear? Is it supported by concrete data or evidence?

No_ Moderately ✓ Yes_ Substantially_

C. APPROACH, METHOD: Is it appropriate? Was there a valid experimental design and data collection plan? Are they competently described and were they competently executed?

No_ Moderately ✓ Yes_ Substantially_

D. RESULTS: Are they clearly presented? Is there appropriate use of tables and figures? Were proper statistics used? Were they used correctly?

No_ Moderately ✓ Yes_ Substantially_

E. DISCUSSION AND CONCLUSIONS: Do they follow from the data and literature review? Are they comprehensible? Are conclusions and recommendations warranted and usable by intended audience?

No_ Moderately ✓ Yes_ Substantially_

Peer Review (cont)

II. Recommendations

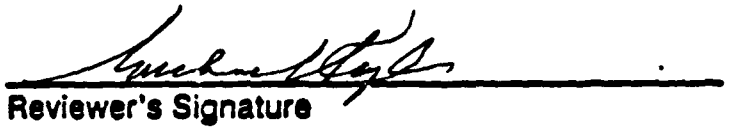
___ Should not be published.

___ Return for reconsideration (e.g., reanalysis, additional data collection, or rewrite). Should not be published as is. (Comments may be made in Section III or as an enclosure.)

___ Publish after minor revisions. (Comments may be made in Section III or as an enclosure.)

_✓_ Publish as is.

My name may / may not appear on the inside cover as reviewer.



Reviewer's Signature

III. Comments on any of the above ratings or recommendations.

## PUBLICATION CHECKLIST

Use for: Research Report, Technical Report, Research Product, Research Note, Special Report, or book published by ARI.

Type of document (circle one): RR TR RP (RN) SP book

Submit an original and one copy of:

Documentation required for publication

✓ 1. Certification DF, signed.

Peer review - 1

__ 2a. Recommended changes made.

__ 2b. Changes not made--reviewer's name not to be used.

Peer review - 2 (only one required for Research Note)

__ 3a. Recommended changes made.

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__ 4a. Required and submitted.

✓ 4b. Not required.

Sensitivity review

__ 5a. Required and submitted.

✓ 5b. Not required.

Security review

__ 6a. Required and submitted.

✓ 6b. Not required.

✓ 7. DD Form 1473, completed.

Manuscript

Foreword

__ 8a. 6.3 research.

__ 8b. Other research funding.

✓ 8c. Not required (Research Note).

Acknowledgment

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Executive summary

__ 10a. Included.

✓ 10b. Not required (RN, RP, or book).

__ 11. Table of contents (with Lists of Tables and Figures).

ARI Form 188, 20 Oct 88

-----page 2-----

Publication Checklist (cont)

Body of the manuscript

✓ 12. Text of report (with Tables and Figures).

(a.) All pages are present and numbered properly.

b. Text is print-ready copy.

c. Table of contents accurately indicates configuration of document.

__ 13. Reference list (documents listed are cited in text).

Appendixes

__ 14a. Included (they are necessary explanatory information).

✓ 14b. None prepared.

Signature of individual completing checklist

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*Figure 3-2. Publication Checklist*

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19. ABSTRACT (Continue on reverse if necessary and identify by block number)

The main purpose of this research was to determine whether or not, and how the degree of cognitive pressure in problem recognition stage can affect the groups decision-making processes. The empirical basis for the study consists of records of groups' problem formulation and solution activities carried out within 12 decision conferences. Following the general thesis that every decision conference can be categorized by the degree of group's cognitive pressure in their problem-recognition stage, the resarch concluded that: 1) the degreeof pressure evoked by the stimuli within a group appear to be inversely related to the amount of option generated to takle the problem; 2) group size and stratum are also important variables in assessing the group's perception of problems.

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DD Form 1473, JUN 86 *Previous editions are obsolete.*

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Working Paper 88-2

# Analysis of Decision Conferences (DC): The impact of the group's cognitive pressures in problem recognition stage on their problem formulation (model building) activities during DC

K J Chun

# Analysis of Decision Conferences (DC)

The impact of the group's cognitive pressures in problem recognition stage on their problem formulation (model building) activities during DC

Ki Jeong, Chun.

June, 1988.

## Introduction

The first perceptions of the group about their problems can strongly affect their cognitive activities during their decision-making processes.

Poole (1981) argued that it is the members' perceptions of task requirements that guide the group's work. And, he added that the group's task representation sets boundaries on acceptable interaction styles and behaviour strategies. In practice, Abric (1971) showed that performance on two experimental tasks depended on the group's task representation.

The first perceptions about the problem may be strongly affected by the relationship between the group's present situation and their mission. To make it clear, Let's see two cases as follows :

Case "A"

To improve an already secure situation, such as the introduction of a new product to enlarge an already secure market share.

Case "B"

When organisations have to respond to intense pressures.

( Eg. seeking a merger to stave off bankruptcy )

It is certain that people in Case "A" would feel much less cognitive pressures than do those in Case "B".

So, the main purpose of this paper is to find whether or not, and how the degree of cognitive pressure in problem-

recognition stage can affect the group's decision-making processes.

The empirical basis for this study consists of records of groups' problem formulation and solution activities carried out within 12 DC which were conducted by DAU at LSE. A copy of the whole data of 12 DESIGN models is included as Appendix 1 and Appendix 2.

1. The degree of cognitive pressure in problem-recognition stage

This may be differed by the stimuli that evokes it along a scale.

cognitive pressure

low ← - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - → high

| | |
|---|---|
| secure situation | urgent situation |
| low stimuli | high stimuli |
| voluntary decision-making | compelling decision-making |
| low constraints | high constraints |

Meanwhile, Mintzberg (1976) categorised decisions by the stimuli that evokes them along a continuum as follows :

(1) Opportunity decisions

These decisions are initiated on a purely voluntary basis, to improve an already secure situation.

(2) Crisis decisions

When organisations have to respond to intense pressures. Here a severe situation demands immediate action.

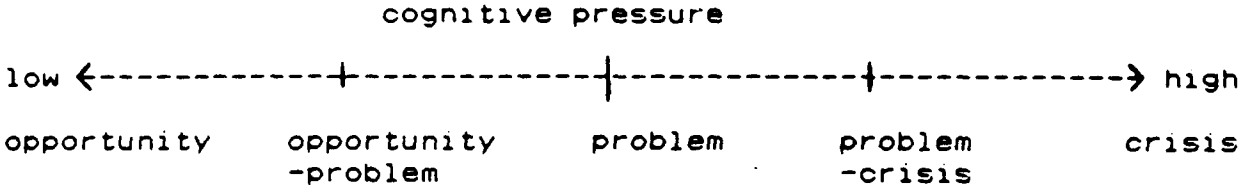
Thus, opportunity and crisis decisions may be considered to form the two ends of the continuum.

(3) Problem decisions

Those fall in between, evoked by milder pressures than crises.

Although I am not satisfied with using his terminology to clarify the degree of the group's cognitive pressure in their problem-recognition stage, I am forced to borrow his in this paper until I find more appropriate ones. (please suggest me, sir!)

Thus, every DC could be categrised by the degree of group's cognitive pressure in their problem-recognition stage as follows:




The judgment of categorisation can be based on referring the section of background, key issues, missions, assumptions and constraints, and sometimes management summary in DC documentation. The rationale to clarify each DC by the degree of cognitive pressure in problem-recognition stage can be found in Appendix 2. However, two examples of the clarification are provided as follows :

* Opportunity cognitive pressure

1-2 May '86 PACTEL

- PA's business lies at the leading edge of IT, in helping major companies and organisations to exploit the technology successfully for efficiency and effectiveness.
- Ignore investment constraint.
- Assume that any growth will go well.
- Assume that we can have anything we wanted.

* Problem-crisis cognitive pressure

9-10 June '87 ICL-Group Information Services

- Now something is radically wrong.
- Group expressed dissatisfaction with the current strategy,---.

2. Total number of options or the number of options per pot ?

As we can see in Table 1 and Appendix 1, the number of pots seems to have no association with group size, stratum, or initial cognitive pressures.

Table 1 : the number of pots against group size and stratum

| number of pots | group size | stratum |
|---|---|---|
| 17 | 11 | 5 |
| 14 | 11 | 4 |
| 13 | 18 | 6 |
| 8 | 13, 14, 19 | 4, 5, 5 |
| 7 | 6, 11, 12 | 4, 4, 5 |
| 6 | 9, 9 | 5, 6 |
| 4 | 7 | 3 |

Rather, it seems to me that the number of pots is strongly influenced by a certain group's own business field and the theme

of the problem with which the group deal during DC.

The following examples support this conjecture persuasively.

| | number of pots | group size | stratum | initial cognitive pressures |
|---|---|---|---|---|
| Case "C"<br>4-5 Mar.'85<br>Office Systems | 7 | 11 | 5 | Oppor-problem |
| Case "D"<br>7-8 Mar.'84<br>European Div. | 17 | 11 | 5 | Problem |

Both cases have same group size (11 persons), same stratum ( 5 ), similar initial cognitive pressures (opportunity-problem, problem), and in same organisation (ICL). But, the number of pots produced in each case shows such a big difference (7 vs. 17).

Why ?

Case "C"

The pots were based on the main product types with which the Office Systems Div. dealt. ( Eg. DRS 20, DRS 300, PC, General Systems, and etc.) The group agreed that they had 7 main product dimensions which they needed to consider in DC.

Case "D"

European Div. covered ICL's European market which consisted of 17 countries. So, they agreed that the case would be based on 17 operating units(pots). (Eg. France, Germany, and etc.)

This fact forces me to think that the number of pots are

strongly affected by the group's own business field and the theme of the problem with which the group deal in DC rather than group size, stratum, or initial cognitive pressures. In other words, the type of pots may have less association with the group's cognitive activity during DC. In practice, there were several DC which had the predetermined dimensions of pots before DC.

Why do I bother with the number of pots ? Because I am interested in finding whether or not such factors as stratum, group size, initial cognitive pressure, and etc. have any association with the number of generated options during DC.

Previous studies tried to find the association between the group's model building activity and such factors as stratum, group size, and etc. through the concept of "model complexity". And, the total number of options were one of the major "ingrediants" to determine the degree of the model complexity.

However, under the belief that the number of pots is more influenced by a certain group's own business field and the theme of the problem with which the group deal during DC, and so sometimes are predetermined before DC, then the total number of options cannot be used as a variable to measure the association between the particular group's model building activity and such factors as stratum, group size, initial cognitive pressure, and etc. Because, generally speaking, the more pots we have, the greater the total number of options we have ( see Table 2 ).

Table 2

| number of pots | total number of options | number of options per pot |
|---|---|---|
| 17 | 86 | 5.1 |
| 14 | 89 | 6.4 |
| 13 | 53 | 4.1 |
| 8 | 47, 40, 34 | 5.9, 5.0, 4.3 |
| 7 | 41, 37, 32 | 5.9, 5.3, 4.6 |
| 6 | 36, 34 | 6.0, 5.7 |
| 4 | 17 | 4.3 |

Thus, I think that the number of options per pot may be more appropriate variable which could be used as one measurement to investigate the effect of group size, stratum, initial cognitive pressure, and etc. on the group's model building activity. As we can see in Table 2 , the number of options per pot seems to be independent of the number of pots, whereas the total number of options are strongly dependent on the number of pots.

3. The impact of initial cognitive pressure on the group's problem formulation (model building) activity

The number of Benefit criteria and the number of options per pot generated during DC seem to have very consistent association with the degree of cognitive pressure in their problem-recognition stage (see Table 3).

Table 3 : Initial cognitive pressure against model building activity

| Cognitive pressure | Date | Number of Benefit criteria(A) | Number of options per pot(B) | A X B | Number of sensitivity analysis |
|---|---|---|---|---|---|
| opportunity | 1-2 May '86 | 6 | 6.0 | 36 | 5 |
| | 16-17 Feb'87 | 5 | 5.9 | 30 | 11 |
| | | Ave. 5.5 | 6.0 | 33 | |
| opportunity -problem | 4-5 Mar '85 | 4 | 5.9 | 24 | 10 |
| | 28-29 May'87 | 4 | 5.0 | 20 | 20 |
| | 25-26 Mar'87 | 4 | 5.3 | 21 | 21 |
| | | Ave. 4 | 5.4 | 22 | |
| problem | 4-5 Feb '85 | 3 | 4.6 | 14 | 24 |
| | 22-23 Apr'85 | 4 | 4.3 | 17 | 4 |
| | 18-20 Jun'85 | 3 | 6.4 | 19 | 16 |
| | 3-4 Jun '85 | 3 | 5.7 | 17 | 20 |
| | 7-8 Mar '84 | 3 | 5.1 | 15 | 5 |
| | | Ave. 3.2 | 5.2 | 16 | |
| problem -crisis | 9-10 Jun'87 | 1 | 4.1 | 4 | 33 |
| | 1-2 Oct.'84 | 1 | 4.3 | 4 | 3 |
| | | Ave. 1 | 4.2 | 4 | |

When they feel less pressure, they not only produce more options to tackle their problems, but also evaluate the options in the light of the more broad dimensions of value (number of criteria). It is the Benefit criteria that give the yardstick of the comparison to the group when they develop a prioritised ordering of options.

There are two main reasons why I exclude Cost criteria here. 1) The figures in Cost criteria are based on real and absolute figures. Thus there are no Within Criterion Weights among pots

and same Across Criteria Weights are given to various Cost criteria. It means that there is no preference trade-off among Cost criteria.

2) In fact, the kind and the number of Cost criteria do not differ much from one DC to another DC. Usually, costs were assessed by year-based criteria, or by operating and capital expences criteria, or by simply (operating) costs criterion.

Note that, however, the number of sensitivity analysis seems to have no association with the degree of cognitive pressure. In fact, as we saw in previous studies (Wooler '86 ; Chun '87), it seems to have the positive relationship with group size.

These findings are supported by Table 4, in which the number of Benefit criteria and the number of options per pot seem to have no association with group size and/or stratum.

Table 4 : Number of options per pot against group size, stratum

| Number of options / pot(x) | group size | stratum |
|---|---|---|
| $6.0 \leq x < 6.5$ | 9, 11 | 4, 6 |
| $5.5 \leq x < 6.0$ | 9, 11, 19 | 5, 5, 5 |
| $5.0 \leq x < 5.5$ | 6, 11, 13 | 4, 5, 5 |
| $4.5 \leq x < 5.0$ | 12 | 4 |
| $4.0 \leq x < 4.5$ | 7, 14, 18 | 3, 4, 6 |

| Number of Benefit criteria | group size | stratum |
|---|---|---|
| 6 | 9 | 6 |
| 5 | 19 | 5 |
| 4 | 6, 7, 11, 13 | 3, 4, 5, 5 |
| 3 | 9, 11, 11, 12 | 4, 4, 5, 5 |
| 1 | 14, 18 | 4, 6 |

| Number of B criteria X Number of options/pot | group size | stratum |
|---|---|---|
| 36 | 9 | 6 |
| 30 | 19 | 5 |
| 24 | 11 | 5 |
| 21 | 6 | 4 |
| 20 | 13 | 5 |
| 19 | 11 | 4 |
| 17 | 7, 9 | 3, 5 |
| 15 | 11 | 5 |
| 14 | 12 | 4 |
| 4 | 14, 18 | 4, 6 |

The number of criteria, the number of options per pot (not total number of options !), and the number of pots are all together major elements to determine the model complexity. My previous study found no association between model complexity and group size, stratum. And, this was proven again in this paper. But, at that time, I could not find what was an influential factor to determine the model complexity. Now, we could say that the model complexity may be strongly affected by the initial cognitive pressure of the group about their problem, and the group's own business field and the theme of the problem with which the group deal in DC.

These findings with previous ones (Wooler ; Chun ; Oldfield) can give more comprehensive picture to understand the group's decision-making activities during DC.

Those are :

1) Although some changes of the model structure may be attributed by group's stratum in light of Restructuring activity, the main

"skeleton" of the model (the number of criteria, the number of pots, and the number of options per pot) may be affected by the degree of the group's cognitive pressures in their problem recognition stage, the group's own business field, and the theme of the problem with which the group deal during DC.

2) Meanwhile, the "flesh and blood" of the model (Scores, Weights, and Sensitivity analysis) may be affected by group size, and stratum.

* Higher stratum managers regard the decision problem differently from lower stratum managers, they give more preference to "soft" dimensions of value such as future potential, risk, and synergy than to "hard" ones such as financial goal, cost reduction, etc.

* Higher stratum managers increase their preferences on future potential and at the same time decrease their concerns on short term financial goals and also include risk as one of their crucial concerns.

* Higher stratum managers revise their models more extensively than lower stratum, in carrying out sensitivity analysis.

* Group size has a positive effect on the number of sensitivity analysis.

## 4. Next research

1) Expansion of this study to HIVIEW model

2) To develop a general model which can describe the decision-making processes in DC

(Eg. Multiple sequence model based on simple sequence model)

3) Options may be categorised as follows:

(i) Ready-made options

The options may be found ready-made, that is, fully developed, in the environment during DC.

(Eg. to determine the site at which new plant might be located)

(ii) Custom-made options

The options may be developed especially for the decision.

(iii) Modified options

The options may combine ready-made and custom-made features - ready-made options are modified to fit particular situations.

People may think that ready-made options are more "visible" than custom-made ones. So I shall try to investigate the effect of these differences in options on the group's decision-making activities, such as the number of sensitivity analysis, type of sensitivity analysis, stratum, and etc.

| cognitive pressure | DC | Benefit criteria | options per pot | Criteria X no. of options per pot | of pots | number of options | group size | Stratum | of sensitivity analysis |
|---|---|---|---|---|---|---|---|---|---|
| opportunity | 1-2 May '86 PACTEL | 6 | 6 | 36 | 6 | 36 | 9 | 6 | 5 |
| | 16-17 Feb '87 ICL | 5 | 5.9 | 30 | 8 | 47 | 19 | 5 | 11 |
| opportunity -problem | 4-5 Mar. '85 ICL | 4 | 5.9 | 24 | 7 | 41 | 11 | 5 | 10 |
| | 28-29 May '84 ICL | 4 | 5 | 20 | 8 | 40 | 13 | 5 | 20 |
| | 25-26 Mar. '87 ICL | 4 | 5.3 | 21 | 7 | 37 | 6 | 4 | 21 |
| problem | 4-5 Feb. '85 ICL | 3 | 4.6 | 14 | 7 | 32 | 12 | 4 | 24 |
| | 22-23 April 85 ICL | 4 | 4.3 | 17 | 4 | 17 | 7 | 3 | 4 |
| | 18-20 June '85 Mars | 3 | 6.4 | 19 | 14 | 89 | 11 | 4 | 16 |
| | 3-4 June '85 ICL | 3 | 5.7 | 17 | 6 | 34 | 9 | 5 | 20 |
| | 7-8 Mar. '84 ICL | 3 | 5.1 | 15 | 17 | 86 | 11 | 5 | 5 |
| problem -crisis | 9-10 June '87 ICL | 1 | 4.1 | 4 | 13 | 53 | 18 | 6 | 33 |
| | 1-2 Oct. 84 ICL | 1 | 4.3 | 4 | 8 | 34 | 14 | 4 | 3 |

## Appendix 1:

Cognitive pressure in problem-recognition stage against model building activities

Appendix 2 : The rationale for the clarification of DC according to the cognitive pressure in problem-recognition stage

<Opportunity cognitive pressure>

1. 16-17 Feb. '87 ICL - International Operations

- To secure for ICL a strong position in high-growth international markets and generate a consistently growing contribution to Group revenues and profits.

2. 1-2 May '86 PACTEL

- To develop PA's IT services, as an international business within corporate guidelines

- PA's business lies at the leading edge of IT, in helping major companies and organisations to exploit the technology sucessfully for efficiency and effectiveness

- Ignore investment constraints

  Assume that any growth will grow well

  Assume that we can have anything we wanted.

<Opportunity-problem cognitive pressure>

1. 25-26 Mar. '87 ICL - Public Services Business

- We are already international in Regional Government, we want to be international in Health Care, we want to be big in Law & Order where there is no dominent international supplier.

- Becoming international was a problem, particularly in light of

restricted resources.

2. 28-29 May '84 ICL - Asia Pacific Div.

- How can we develop ICL's position in Asia Pacific to one of significant strength while at the same time generating increased profitability and achieve all our objectives.

- Need to define "significant strength"

Does strength mean being in the top three in each country in which we operate ? Or does it mean No. 1 in profit in each selected market segment ?

- How to achieve profitable growth with a limited resource.

3. 4-5 Mar '85 ICL - Office Systems

- To make ICL the leading supplier of quality office systems to companies in W. Europe with a profitable turnover greater than 100 M p.a.

- Match industry leaders in development and sales productivity

- We have a long term objective to reach 20 % PBT. In 1985, we are targetting only 6 %.

- Insufficient funds from outside Office Systems

<Problem cognitive pressure>

1. 4-5 Feb. '85 ICL - Central Government Sales

- To improve the efficiency and effectiveness at a profit, of UK Central Govt., the agencies funded by Treasury and pull through of ICL products.

- There was a need for sustained profit, whilst maintaining a short term profit stance and a lack of support for the Group's

particular needs from Business Centres.

- There was a need for the Group to be more responsive to external development/collaboration.

2. 22-23 April '85 ICL - End User Computing

- Short term profit problems

To get the right balance on short and long term

- Difficult to move away from what is inherited.

- Company culture is still box and not solution oriented.

3. 18-20 June '85 Mars - R&D Div.

- Overall, there was a sense of a Div. that operated in the past in a somewhat fragmented fashion, with current pressures of resources requring a more overall view of the Div.'s activities.

- Both money and people resources are more scarce now than in the past.

4. 3-4 June '85 ICL - Applied Systems

- To develop a method of prioritising AS activities by markets, types of spend, people, quality, etc and interdependence with other groups, as well as by product

- People are accountable for things they do not have sufficient authority for. This creates inefficiency and serious disfunctions in the Company.

- Net spend must be less than 24M for '85 and 24.3 for '86.

5. 7-8 Mar. '84 ICL - European Div.

- To reach a decision on how to deploy ICL - ED resources to achieve the "grow in the Europe" strategy

- ICL cannot achieve corporate growth by growing uniformly be-

cause much of the business in Europe is non-profitable.

<Problem-crisis cognitive pressure>

1. 9-10 June '87 ICL - Group Information Services

- Now something is radically wrong.

- Group expressed dissatisfaction with the current strategy, and indicated that it needed to be improved so as to provide more integration nationally, to facilitate administration and to provide support to ICL's salesmen and customers.

2. 1-2 Oct. '84 ICL - Professional Services

- Significantly to increase ICL's revenue and profit ; This led the group to consider only one criterion "financial goals".