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INFORMATION PROCESSING
OPTIONS FOR UNIDO'S
TIES SYSTEM
THE SECOND DECADE

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I. BACKGROUND

The recent meeting of the TIES' participants in Lima recommended that UNIDO continue to maintain a central database of detailed and industry-level information on technology transfer contracts. This re-affirmation of the importance of the data exchange aspect of TIES will require some work on UNIDO's part to update it's processing capabilities of TIES data.

The mainframe-based information system developed for TIES in the late 70s is no longer in operation. The personal computer-based software package, CORIS, is implemented or in the process of being implemented in 8 member countries (Greece, India, Indonesia, Malaysia, Nigeria, Philippines, Thailand, and Tunisia). Most of the remaining TIES member countries expressed an interest in adopting the CORIS software package. UNIDO should therefore consider elaborating a centralized database on technology transfer contracts which is compatible with CORIS. This report will discuss some options for information processing for TIES data over the next several years.

II. LEVELS OF INFORMATION EXCHANGE: PROPOSALS FOR THE TIES SYSTEM OF THE 90S

The TIES data exchange has been divided into four levels (TIES I, IIA, IIB, IIM). These levels are defined in various documents and coding manuals for the system). The Lima meeting agreed that the TIES I, (industry level) data exchange should be maintained and that the TIES II (contract level) data exchange should be revitalized.

A. TIES I DATA EXCHANGE

The TIES I exchange is handled on a manual basis by UNIDO. Some countries submit the data, typed, on Tables 1 - 8 contained in the TIES coding manual. Others will, in the near future, begin using the CORIS software to generate the TIES I tables. *UNIDO should consider the elaboration of a computer-based system/method for processing manual-based and CORIS-generated TIES I data.* Before this can be done certain issues must be resolved:

1.   Does the data reported represent the majority of technology transfer transactions in the country? (Some registries only see applications from a limited set of industries).

2.   Reporting of actual versus estimated technology payments.

3.   Are countries adhering to the TIES-standard definitions when submitting data on the TIES I tables?

4.   Establishment of a time table for data submission and exchange.

5.   Formal commitment, in writing, to provide and exchange data.

The following are my recommendations regarding each of these issues.

1.   <u>Does the data reported represent the majority of technology transfer transactions in the country?</u>

Request each country to submit a 1 - 2 page summary which explains any anomalies in the data reported on the TIES I tables; such as (but not limited to):

● Industrial sectors not included (e.g. Defense, nuclear industry, etc.).

● Types of agreements not included (e. g. service agreements, equipment purchase, franchising, etc.).

● Whether contracts over a certain dollar amount are excluded (e.g. contracts with payments over X dollars).

● Any other technology transfer agreements not reviewed by the registry.

The summary should include an estimate of the percentage of technology transfer transactions for the country which is represented by the data in the tables.

This information would be useful when comparing data of the various TIES members. The TIES system should seek to gather data which is based on common definitions. Where this is not possible the summary would alert the user to individual country anomalies. The summary would, in effect, serve as the introduction for the TIES I tables for a particular country. Once written it would only have to be updated if changes occurred in the reporting situation.

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2.   <u>Remind all members that TIES is not an accounting system but rather a management information system. It was designed as a forward-looking tool to aid in contract negotiation.</u>

Data on payments exchanged via TIES is *estimated* data approved at the time the contract is registered. Many registries do not collect or do not have access to actual payments made on the agreements. (Even if they did that data would not be available until at least one year after the contract takes effect or when the first payments are actually made).

Registries do not necessarily know when a contract takes effect (it may not be immediately after registration). Therefore, the registry approval date becomes a reasonable date on which to determine an exchange rate for use in calculating estimated payments.

Member countries may wish to issue updates on their TIES I data tables one year later, using actual payment data. The compilation of this historical backward-looking data on actual technology payments is, however, beyond the scope of the current procedures of most registries and is generally considered a banking function.

3.   <u>UNIDO should issue a new TIES I coding manual with the new TIES I tables and clarified and expanded definitions of data items.</u>

The expert group meeting held in Vienna in June 1988 to prepare for the TIES meeting proposed various changes/additions to the TIES I tables. the need for revision of the tables was based on input from various of the members of the TIES system. The new TIES tables were approved at the Lima meeting. Some issues still need to be clarified/resolved. Certain of them call for changes to the various editions of the CORIS software (Standard English, French, Spanish; Malaysian, Indian, and Thai). UNIDO should monitor that process to ensure consistency of all editions.

A.)   Table 2 - Number of Contracts by Contract Class

• The CORIS system does not currently produce this table nor, in fact, is the data collected along this division of joint venture vs. non-joint venture. If, indeed, this table is to become a part of the TIES I table series,. the CORIS contract card will have to be revised (Item 3.2) to capture data in this way. The database programs must be modified and one report program added to generate this new table.

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B.)   Table 3 - Collaboration Types

• Will the collaboration types which apply to service agreements continue to be included? (construction or set-up; quality control, etc.).

C.)   Table 6 - Duration

• Latin American member countries expressed the need for a category on contract renewals in this table. Currently contract renewals are classified under a category in contract class on the CORIS contract card. Contract renewals are not broken out on any of the TIES I tables. Including such a category would require a change to the part of the CORIS software which produces the TIES I tables.

• Modify CORIS software to produce a TIES I table which corresponds to the new duration categories:
> Zero years
> 0.01 - 2.99 years
> 3.00 - 4.99 years
> 5 years
> 5.01 - 9.99 years
> 10 years
> > 10 years

C.)   Table 7 - Specification by Payment Type

✔ In the CORIS software change the title of the category 'Re-imbursement Payments' to 'Personnel Fees' on this table.

D.)   Royalty Rates - Table 8

1. During the Lima meeting there was a great deal of discussion concerning the base for calculating royalty rate. In the past this definition has been Gross Sales minus Cost of Goods Sold. The definitions for these terms vary from country to country.

The definition to be used in TIES must be clarified to state how gross sales are calculated and what exactly should be included in Cost of Goods Sold (e.g. purchases of materials from the supplier?).

Any members who cannot supply data which meets the definition should devise a conversion factor which could be used to meet the

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agreed upon net sales definition. (Local net sales multiplied by the conversion factor - TIES net sales).

This factor could either be:

a.) Applied by the member country before submitting it's data to UNIDO (for those who provide data manually).

b.) Applied by the CORIS software before TIES I tables are produced (implies a change to each CORIS software package at the local level and in the CORIS standard versions).

c.) Applied by UNIDO (either manually or via an automated procedure) before re-distribution of the TIES I tables to member countries.

• Clarify the royalty rate to report when more than one royalty rate is specified in the contract.

Suggestion: Use the royalty rate which represents the average rate estimated to be paid over the duration of the contract.

Example: The royalty rate is 2.5% on the first $100,000 of net sales and 2.0% of sales over $100,000. The estimated sales for the 5 years of the contract are $500,000.

Royalty A: $100,000 x 2.5% = $2500
Royalty B: $400,000 x 2.0% = $8000

$$\frac{\text{Total Estimated Royalty Payments}}{\text{Total Estimated Net Sales}} = \text{TIES I Royalty Rate}$$

$10,500/$500,000 = 2.1% TIES I Royalty Rate

- Modify CORIS software to produce a TIES I table which corresponds to the new royalty categories:

< 1 %
1 - 1.99 %
2.0 - 2.99 %
3.0 - 3.99 %
4.0 - 4.99 %
5.0 - 5.99 %
6.0 - 6.99 %
7.0 - 7.99 %
8.0 - 8.99 %
9.0 - 9.99 %
> 10 %

D.) Table 8 - Total Contractual Payments

Reiterate the fact that the payments reported on this table are *"estimated"* payments as approved in the technology transfer agreement.

Detail how to calculate royalty payments (Royalty rate x Net sales by year over the duration of the agreement). Specify that 'other' types of payments (lumpsum, etc.) should be added to royalty payments to arrive at the total payment figure. Reiterate that dollar figures are calculated using the exchange rate in effect for that agreement on the day the contract is approved.

4. Establish a time table for TIES I data submission and exchange and stick to it.

Revitalization of the TIES data exchange will require a time and resources commitment by both member countries and UNIDO.

A.) Agree on a date by which UNIDO will have TIES I tables.

Suggestion: August 15 for data for the period January 1 - June 30. February 15 for the period July 1 - December 31. If a country cannot supply data by these dates a telex should be sent explaining the cause of the delay or if the data cannot be submitted the reason why not.

B.) UNIDO should commit to a date by which data will be processed and returned to members;

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Suggestion: September 30 for data for the period January 1 - June 30. March 30 for the period July 1 - December 31. Data processing should not be delayed for late data arrival. UNIDO staffing (vacation/mission scheduling) should be planned to meet these dates.

Meeting these, or other dates which can be committed to, on a consistent basis will help in restoring confidence in the data exchange.

5.   <u>Establish a formal written TIES data exchange agreement.</u>

In order to re-affirm the TIES data exchange UNIDO should develop a written memorandum of understanding between UNIDO and each TIES member country. This agreement will spell out what data will be provided, by when and in what form. The reports that UNIDO will deliver will be listed. An annual time table will be specified. This will re-enforce TIES as a group of registry offices with a strong commitment to cooperation

<u>B. TIES I Data Processing by UNIDO.</u>

The Lima meeting agreed that UNIDO should continue to act as the clearinghouse for the exchange of TIES I data. For the foreseeable future TIES I data will probably be submitted as a mix of manually-prepared and CORIS-prepared tables. The following are some of the options for processing TIES I tables:

1.)   Photocopy TIES I tables from each country and send a full set to each member who has submitted data with or without some data analysis. This option requires no change to current procedure and may be a suitable option for the mid-year data exchange.

2.)   Combine data from each member on a set of master tables (as per Working Paper number 11). This could be done manually or via an automated system.

3.).   Combine data from each country with it's historical data in a 'country' by country report. Thus, for example, the most recent data would always be presented against data from the previous 5 years.

Some countries expressed reservations about comparing TIES I data from one country to another (Option 2 above). An *intra-country* compilation (Option 3 above), on the other hand, would not raise this consistency issue and would be useful in seeing trends within a country over time.

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Similarly, a single industry or group of industries within each country could be spotlighted over time. Graph illustration to accompany the tables could be useful.

This approach could be used to produce an annual TIES I report. that would not conflict with member countries' concerns about comparison of data between countries. A computerized system would be most helpful in processing the data for this system.

The options for a computerized system include the following:

1.) Expand the CORIS system to include a TIES I database

A.) TIES I data files generated by each local CORIS would be used as input to a UNIDO multi-country CORIS.

B.) Develop a data input program for TIES I data submitted manually.

C.) Write some new CORIS reports to generate time series, country-by-country reports.

D.) Use output files from CORIS as input to LOTUS 1-2-3 (or some other easy-to-learn spreadsheet program which can generate graphs) to produce graphic illustrations for the annual report.

UNIDO may wish to solicit proposals for the elaboration of such a TIES I CORIS database program from the developers of CORIS.

2.) Use LOTUS 1-2-3 (or some other easy-to-learn spreadsheet program which can generate graphs) to develop a 5 year, country-by-country TIES database with graphic output.

A.) Develop a worksheet template to serve as the input mechanism for both manual and CORIS-generated TIES I data.

B.) Develop some tabular and graph-illustrated time-series reports for each country for the annual report.

A spreadsheet program has the advantage that any moderately skilled-PC user can design and develop new reports as the information processing needs of the TIES system change.

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C. TIES II DATA EXCHANGE

The TIES II (contract by contract) data exchange has fallen into disuse over the last couple of years. The sparsity of data received by UNIDO and the lack of maintenance and updating of the mainframe software which processed TIES II data contributed to the decline of the data exchange.

The Lima meeting sent a clear message that the TIES II data exchange should be revitalized and that UNIDO's Technology Group should serve as the clearinghouse for the centralized database.

At the moment there is not an active computerized system in operation for collecting TIES II information at UNIDO. The following issues must be resolved before such a system can be set up:

1.) **What TIES data will be collected?**

   • In the past, three levels of TIES II information have been collected (IIA, IIB and IIM). These levels are defined in various TIES coding manuals and documents. The levels evolved because various TIES members could not *supply* the full set of data required on the TIES coding form.

   It has been agreed, however, that anything less than full TIES II(B) data is not that useful to registry offices that *receive* it. (At least that was the case during the first 5 years of system operation).

   I suggest UNIDO identify the set of contract-by-contract data (based on the CORIS contract card) that will be of real value to exchange (the critical questions are "**What data will be useful to you?**" and "**Can you provide that type of data?**")

2.) **Which countries will provide TIES II data?**

   • Once the TIES II data to be exchanged is identified, UNIDO should enquire, in writing, as to what portion of that data each member country can supply. As with TIES I data a written commitment should be made to supply the TIES II data.

3.)   <u>Establish a time table for TIES II data submission and exchange</u>

A.) Agree on a date by which UNIDO will have TIES I tables.

Suggestion: August 15 for data for the period January 1 - June 30.
February 15 for the period July 1 - December 31. If a country cannot supply
data by these dates a telex should be sent explaining the cause of the delay
or if the data cannot be submitted the reason why not.

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by when and in what form. The reports that UNIDO will deliver will be listed.
An annual time table will be specified. This will re-enforce TIES as a group
of registry offices with a strong commitment to cooperation

5.)   <u>Will TIES II data already in UNIDO's possession be included in</u>
<u>the database?</u>

• The data previously collected by the TIES system; some of which is
in the form of printouts and some still on coding forms, should be reviewed
by UNIDO. If it is felt that the data would be a valuable addition to the new
TIES II system, it should be included. It would seem unfortunate to leave
aside all the work on both the registry's and UNIDO's part that has been put
into collecting that data.

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D. TIES II Data Processing by UNIDO.

Given the number of countries who have adopted CORIS (8) and the continuing interest in utilizing the software by other TIES members, UNIDO should develop a data processing system which uses CORIS or CORIS-compatible software. It is not recommended that UNIDO attempt to maintain a manual TIES II database. The following are some options for processing TIES II data:

1. Use of CORIS - No Modification

• The standard English version of CORIS is designed to accept, as input to it's database, the data from one country. That is a member using CORIS will store it's own data in the database. Via menu selection number 8 (TIES II data exchange) a TIES member using CORIS, can generate ID Keys and a data file containing it's TIES II data. This file can be sent, on diskette, to UNIDO or to other TIES members.

• UNIDO, using the same version of CORIS (that database would, in principle contain no data unless UNIDO input some sample contract data with the country code UNE) can use CORIS menu item 9 (Foreign Data Base) to search for contracts by supplier name, industry code and product code. The contracts which meet the criteria specified will be printed.

Use of the standard English CORIS software by UNIDO, as it exists, is predicated on certain assumptions:

A.) That the Technology Group has full time access to a personal computer in it's area.

B.) That TIES II data is submitted by member countries on diskette, with files generated by CORIS.

C.) That it is acceptable that there will be no central TIES database per se. In other words all of the TIES data from all of the countries who submit it will not be resident on the hard disk of the PC. This means that:

1.) Searches for data will be on a country by country basis from diskette.

2.) Results of searches will be printed on a country by country basis. You will not be able to combine data from several countries in a single CORIS-generated report.

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3.) Searches will be more time consuming than if they were done from data on hard disk due to diskette swapping and searching from diskette. (Still the total time involved is small - probably only a difference of some minutes.)

D.) That there is no need to process TIES II data received on coding forms (from countries not using CORIS).

E.) That TIES II data in UNIDO's possession, on coding forms or on printed reports from the old mainframe-based TIES system, will not be processed.

2.) Development of a UNIDO CORIS

UNIDO could solicit a proposal from the developer's of each of the CORIS versions on the elaboration of a version of CORIS for UNIDO's use as a central TIES database. (Since CORIS was designed as a single-country database this could involve a significant amount of work). That version of CORIS would have the following characteristics:

A.) Support a single database which can include data from multiple countries.

B.) Accept TIES II files on diskette from TIES member countries.

C.) Allow data input (from the keyboard) of TIES II data from multiple countries (to process TIES II data in UNIDO's possession and TIES II data received on coding forms).

D.) Generate multi-country reports based on user-input search criteria.

The work to develop such a UNIDO CORIS or TIES CORIS software package only makes sense if UNIDO expects to consistently receive a significant amount of TIES II data. In addition, it is most likely that a larger hard disk for the TIES PC will be needed. (The size can be estimated by multiplying the number of TIES II files that you expect to receive on a yearly basis by the amount of storage space required by the TIES CORIS record; divide the result by 1000 to obtain megabytes; multiply that number of megabytes by 5 if you intend to maintain a 5 year database of TIES II data. Adding another 10 - 20 MB for other applications would be a good idea).

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3.) Use of CORIS & a Spreadsheet Program

• With this option CORIS could be used as described in number 1 above (Use of CORIS - No Modification). While multiple country reports could not be produced from CORIS, the TIES II country files on diskette could be imported into LOTUS 1-2-3 (or some other spreadsheet program). Various other multiple country data analysis, reports and graphs could be produced from that software package.

• A series of spreadsheet templates could be developed into which the TIES II data files would be read from diskettes provided by member countries. Additionally, data already in UNIDO's possession could be input into the spreadsheet as well as data submitted on the coding forms. Country by country spreadsheets could be linked to produce multi-country reports.

• A spreadsheet program was not an appropriate application to use for the development of CORIS because of the size of each data record, the range of reports required and the data analysis needed. For TIES II data, however, (which presumably will be a limited portion of the CORIS data) a spreadsheet application should serve well. Graph and table reports could be produced for each country (see example which follows this page). Additional graphic and tabular outputs and data analysis are easily developed by the PC *users* in the Technology Group.
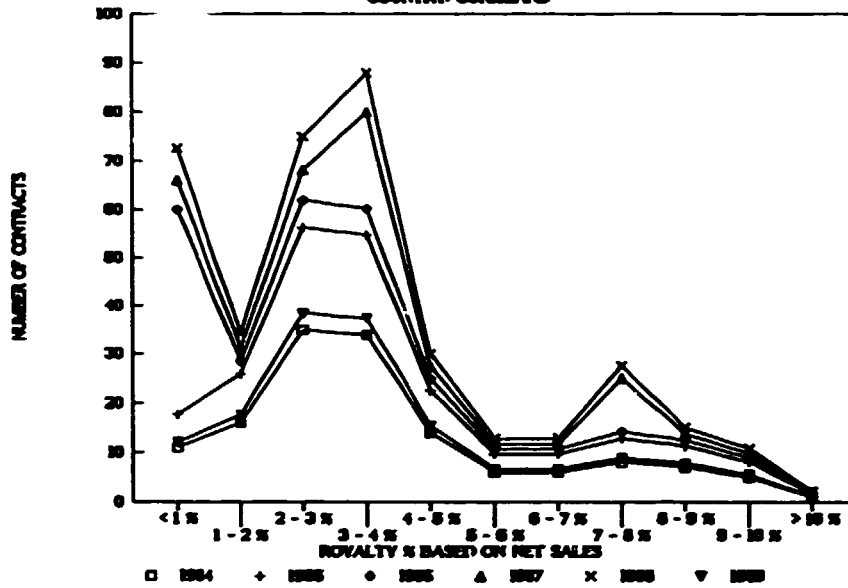
III. SUMMARY

The Lima meeting clearly requested the re-establishment of the TIES data exchange. There are a number of issues that must be resolved regarding the exchange of TIES data including what data will be exchanged, and by whom.

Once those issues are clarified UNIDO will have to make a commitment of staff time and computer resources to implement and *maintain* TIES data processing. Without that commitment the data exchange aspect of the TIES system cannot be supported and re-vitalized.

NUMBER OF CONTRACTS BY ROYALTY RATE
COUNTRY: CORISLAND

ROYALTY RATE BY NET SALES
CORISLAND

RATE	< 1 %	1 - 2 %	2 - 3 %	3 - 4 %	4 - 5 %	5 - 6 %
NUMBER OF CONTRACTS						
1984	11	16	35	34	14	6
1985	18	26	56	55	23	10
1986	60	28	62	60	25	11
1987	66	31	68	80	27	12
1988	73	34	75	88	30	13
1989	12	18	39	37	15	7
TOTAL	239	153	335	354	134	57

RATE	6 - 7 %	7 - 8 %	8 - 9 %	9 - 10 %	> 10 %
NUMBER OF CONTRACTS					
1984	6	8	7	5	1
1985	10	13	11	8	2
1986	11	14	12	9	2
1987	12	25	14	10	2
1988	13	28	15	11	2
1989	7	9	8	6	1
TOTAL	57	96	67	48	10