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PRESENTATION TO THE CONSULTATIVE GROUP ON INFORMATICS TECHNOLOGY FOR DEVELOPMENT (COGIT)

BUENOS AIRES

11-13 DECEMBER 1989

ATUL WAD

CENTER FOR THE INTERDISCIPLINARY STUDY OF SCIENCE AND TECHNOLOGY

NORTHWESTERN UNIVERSITY

MR. CHAIRMAN, IT IS A GREAT PLEASURE AND HONOR TO BE BACK IN THE BEAUTIFUL CITY OF BUENOS AIRES AS THE GUEST OF THE CENTER FOR ELECTRONICS AND INFORMATICS TECHNOLOGY OF THE NATIONAL INSTITUTE FOR INDUSTRIAL TECHNOLOGY. I WOULD LIKE TO THANK YOU AND THE ORGANIZERS, AND UNIDO, ON WHOSE BEHALF I AM HERE, FOR THIS OPPORTUNITY TO PARTICIPATE IN WHAT PROMISES TO BE AN EXCITING AND POSITIVE MEETING.

IN THIS BRIEF PRESENTATION I WOULD LIKE TO FOCUS ON SEVERAL SPECIFIC POLICY RELATED ISSUES IN THE CONTEXT OF INFORMATICS DEVELOPMENT IN LATIN AMERICA. CLEARLY, MY SUGGESTIONS AND IDEAS NEED TO BE TAKEN AS SUGGESTIONS, AND NOT AS DEFINITIVE SOLUTIONS. THE QUESTION OF APPROPRIATE AND RELEVANT POLICIES FOR INFORMATICS IS A DIFFICULT ONE,, AND NOT ONE THAT CAN BE RESOLVED SIMPLY AND QUICKLY, PARTICULARLY TODAY, AS THE WORLD EXPERIENCES MAJOR POLITICAL AND ECONOMIC CHANGES AND UPHEAVALS. HOWEVER, GIVEN THE COMPLEXITY OF THE SITUATION, I HAVE TRIED, FOR THIS MEETING, FOCUS ON SOME VERY CONCRETE IDEAS AND GUIDELINES THAT COULD OPTIMIZE THE PARTICIPATION OF LATIN AMERICAN NATIONS IN GLOBAL

INFORMATICS TECHNOLOGY AND THE BENEFITS IT CAN DERIVE AS A RESULT. CLEARLY THERE IS AN IMPLICIT ASSUMPTION IN WHAT I SAY: THAT IS, THAT THE MODERN WORLD CONTEXT OFFERS SPECIFIC OPPORTUNITIES THAT COULD POTENTIALLY BE EXPLOITED BY LATIN AMERICA,, IF THEY RECOGNIZE THESE OPPORTUNITIES ACCURATELY AND HAVE THE POLITICAL WILL TO PROMOTE AND DEVELOP MECHANISMS FOR THEIR EXPLOITATION.

BEFORE I PROCEED ANY FURTHER, I WOULD LIKE TO SAY A FEW WORDS ABOUT MYSELF AND WHERE I COME FROM, SO AS TO PROVIDE YOU WITH SOME CONTEXT FOR MY COMMENTS.

IT HAS BEEN SOME TIME SINCE I HAVE BEEN INVOLVED IN A UNITED NATIONS EVENT THOUGH OVER THE YEARS I HAVE BECOME QUITE FAMILIAR WITH THE ACTIVITIES AND ORGANIZATION OF THE U.N. SYSTEM AND ITS REGIONAL INITIATIVES IN HIGH TECHNOLOGY. I SPENT THREE VERY ENJOYABLE YEARS WITH THE UNITED NATIONS CENTER FOR SCIENCE AND TECHNOLOGY FOR DEVELOPMENT IN NEW YORK, PRIMARILY WORKING ON THE ESTABLISHMENT OF A PROGRAM DESIGNED TO ALERT DEVELOPING COUNTRY POLICY MAKERS TO THE IMPLICATIONS OF NEW AND EMERGING TECHNOLOGIES. THIS WAS CALLED THE ADVANCE TECHNOLOGY ALERT SYSTEM OR "ATAS" AND SOME OF YOU MAY KNOW ABOUT IT. DURING THE TIME I WAS THERE, WORKING CLOSELY WITH DR. AKLILU LEMMA, WE WERE ABLE TO PUT OUT FOUR ATAS BULLETINS - ON TISSUE CULTURE, MICROELECTRONICS BASED AUTOMATION, NEW INFORMATION TECHNOLOGIES AND TECHNOLOGY ASSESSMENT FOR DEVELOPMENT. THESE BULLETINS WERE ACCOMPANIED BY SEVERAL INTERNATIONAL MEETINGS DEALING WITH VARIOUS ASPECTS OF NEW TECHNOLOGIES AND THEIR IMPLICATIONS FOR DEVELOPING COUNTRIES.

THE ATAS PROGRAM WAS WELL RECEIVED BY DEVELOPING COUNTRY POLICY MAKERS.

UPON LEAVING THE U.N. I RETURNED TO NORTHWESTERN UNIVERSITY, WHERE OVER THE PAST THREE YEARS, I HAVE BEEN INVOLVED IN A SOMEWHAT DIFFERENT BUT RELATED ENTERPRISE CALLED THE INTERNATIONAL BUSINESS DEVELOPMENT PROGRAM OF THE CENTER FOR THE INTERDISCIPLINARY STUDY OF SCIENCE AND TECHNOLOGY, (SEE ATTACHMENTS). TODAY THIS PROGRAM, CALLED IBD, IS EXTREMELY WELL REGARDED AND SUCCESSFUL AND EFFORTS ARE UNDERWAY IN MANY COUNTRIES TO EMULATE THE MODEL THAT WE HAVE DEVELOPED. ESSENTIALLY, IBD IS A UNIVERSITY BASED EFFORT TO DEVELOP STRONGER LINKAGES WITH INDUSTRY, PARTICULARLY SMALL AND MEDIUM SIZED ENTERPRISES IN THE US AND OVERSEAS. THE FOCUS OF IBD IS TO ASSIST THESE COMPANIES IN THEIR INTERNATIONAL TRADE AND TECHNOLOGY EFFORTS. AS SUCH, WE HAVE BECOME QUITE KNOWLEDGEABLE ABOUT THE SPECIFIC PRACTICAL ISSUES FACING SUCH COMPANIES WITH RESPECT TO SUCH MATTERS AS TECHNOLOGY ACQUISITION, LICENSING AND TRANSFER, STRATEGIC ALLIANCES, INTERNATIONAL TRADE, MARKETING ETC. I MENTION IBD BECAUSE IT HAS BEEN A GREAT LEARNING EXPERIENCE OF A DIFFERENT NATURE. WHILE AT THE U.N. I WAS ALWAYS CONFRONTED BY THE NEED FOR MORE "PRACTICAL" AND "ACTION ORIENTED" EFFORTS. BUT GIVEN THE WAY THAT THE U.N. SYSTEM IS ORGANIZED, SUCH AN ACTION ORIENTATION OFTEN WAS VERY DIFFICULT TO ACHIEVE. MOREOVER, THE WORK AT THE U.N. WAS PRIMARILY BASED UPON INTERACTIONS WITH, AND ASSUMPTIONS ABOUT THE ROLE OF, THE PUBLIC SECTOR AND THE SCIENTIFIC AND TECHNOLOGICAL ESTABLISHMENT. WE HAD LITTLE TO DO WITH THE PRIVATE SECTOR, AND OFTEN TENDED TO VIEW IT AS A MALIGN

AND UNFRIENDLY FORCE. HOWEVER, AT IBD, I HAVE LEARNED TO APPRECIATE THE STRENGTHS OF THE PRIVATE SECTOR, AND MORE IMPORTANTLY, THEIR PARTICULAR WAY OF THINKING, IN A VERY DEEP AND DETAILED FASHION. THIS KNOWLEDGE HAS BEEN DIRECTLY RELEVANT TO MY CONCERNS WITH THE EVOLVING AND CHANGING IMPLICATIONS OF NEW TECHNOLOGIES FOR DEVELOPING COUNTRIES.

DURING MY TIME AT NORTHWESTERN, I WAS IN ADDITION TO WORKING ON THE IBD PROGRAM, STILL ABLE TO CONTINUE MY WORK ON SCIENCE AND TECHNOLOGY RELATED ISSUES IN DEVELOPING COUNTRIES. IN PARTICULAR, I WAS CENTRALLY INVOLVED IN A MAJOR PROJECT CONDUCTED BY SRI INTERNATIONAL (THE ORIGINAL STANFORD RESEARCH INSTITUTE) ON COOPERATION BETWEEN LATIN AMERICA AND THE UNITED STATES IN SCIENCE AND TECHNOLOGY. THE STUDY WAS RECEIVED EXTREMELY WELL BY THE US CONGRESSIONAL SUBCOMMITTEE ON SCIENCE AND TECHNOLOGY AND DELIBERATIONS ARE STILL UNDERWAY ABOUT HOW TO IMPLEMENT THE RECOMMENDATIONS, WHICH FOCUS PRIMARILY ON THE NEED FOR INCREASED SUPPORT AND A BROADER TECHNOLOGICAL BASE FOR SUCH COOPERATION. I SHOULD POINT OUT THAT THIS STUDY WAS FUNDED BY THE US NATIONAL SCIENCE FOUNDATION, AND IT GAVE ME A VERY GOOD INSIGHT INTO HOW THE US S&T ESTABLISHMENT VIEWED SCIENCE AND TECHNOLOGY IN DEVELOPING COUNTRIES, AND HOW DRAMATICALLY THEIR VIEW DIFFERED FROM THAT OF THE U.N. AS WELL AS OTHER DEVELOPED NATIONS. SUBSEQUENTLY, AND VERY RECENTLY, OUR CENTER JOINTLY WITH SRI INTERNATIONAL HAVE RECEIVED A LARGE CONTRACT OF 2.25 MILLION US DOLLARS TO CONDUCT A PROGRAM OF RESEARCH ON TECHNOLOGY POLICY AND ASSESSMENT IN DEVELOPING COUNTRIES FOR THE US AGENCY FOR INTERNATIONAL DEVELOPMENT. THIS PROJECT INVOLVES RESEARCHERS FROM

MAJOR US UNIVERSITIES INCLUDING YALE, HARVARD, STANFORD, BERKELEY, UNIV. OF PENNSYLVANIA AND GEORGIA TECH. AS WELL AS PROMINENT INTERNATIONAL EXPERTS SUCH AS FRANCISCO SAGASTI.

I MENTION THESE TWO EXPERIENCES, THE FIRST INVOLVING HEAVY INTERACTION WITH THE PRIVATE SECTOR AROUND THE WORLD, AND THE SECOND WITH THE US DEVELOPMENT ASSISTANCE AND S&T COMMUNITY, BECAUSE WHILE I WAS AT THE U.N. THESE TWO GROUPINGS WERE THE MOST DIFFICULT TO COOPERATE WITH. HOWEVER, I HAVE LEARNED TO RESPECT THEIR VIEWS AND UNDERSTAND THEIR PERSPECTIVES, ESPECIALLY IN THE CONTEXT OF THE SUBJECT OF THIS MEETING, NEW TECHNOLOGIES IN INFORMATICS. I HOPE TO BE ABLE TO SHARE SOME OF THESE THOUGHTS WITH YOU AT THIS MEETING.

IN PARTICULAR, I WOULD LIKE TO FOCUS ON SOME SPECIFIC ISSUES, IDEAS, AND PERSPECTIVES THAT HAVE BEEN DRAWN FROM MY WORK AT NORTHWESTERN AND A LARGELY PRIVATE SECTOR/ US PERSPECTIVE IN TERMS OF WHAT THEY MAY MEAN FOR INFORMATICS POLICY IN LATIN AMERICA.

AS I AM SURE ALL OF YOU ARE AWARE, THE WORLD IS CHANGING RAPIDLY. TODAY,THE ATTENTION OF THE WORLD IS FOCUSED ON THE POLITICAL CHANGES IN EASTERN EUROPE AND THE ECONOMIC ADVANCES IN THE SOUTH EAST ASIAN REGION. REGRETTABLY, DURING THE 1980'S LATIN AMERICA AND AFRICA SUFFERED THE MOST AND THE 80'S ARE BEING DESCRIBED AS THE LOST DECADE FOR THE COUNTRIES IN THIS REGION. OF COURSE, THIS IS NOT SAY THAT CERTAIN POSITIVE CHANGES HAVE NOT OCCURRED IN THESE REGIONS, BUT THAT THEY HAVE BEEN OVERSHADOWED BY THE TREMENDOUS ECONOMIC GROWTH OF THE NEWLY INDUSTRIALIZED

COUNTRIES OF ASIA, SUCH AS KOREA, TAIWAN, HONG KONG AND SINGAPORE, AND NOW THAILAND, MALAYSIA AND INDONESIA. AND, FURTHERMORE, THE RECONCILIATION IN EASTERN EUROPE, THOUGH MORE RECENT, HAS ALSO DOMINATED WORLD EVENTS.

BUT I BELIEVE THAT THIS CHANGING, SLOWLY AND PERHAPS IMPERCEPTIBLY. WHERE ONCE, FOR EXAMPLE, MOST OF THE COMPANIES THAT WE WORK WITH WERE INTERESTED IN ASIA AND EUROPE, NOW THEY ARE BEGINNING TO ASK ABOUT LATIN AMERICA. AND AT THE GOVERNMENTAL LEVEL, US PREOCCUPATION WITH ITS STRATEGIC INTERESTS AND RELATIONSHIPS WITH LATIN AMERICA ARE GOING THROUGH A REASSESSMENT. THE DEPARTMENT OF COMMERCE, FOR EXAMPLE, NOW EMPHASIZES LATIN AMERICA AS THE REGION WHERE THE ECONOMIC INTERESTS AND FUTURE OF THE US LIE. THE GROWING DISCUSSIONS ABOUT NORTH AMERICAN REGIONALISM (US, CANADA, MEXICO) AND THE PUBLIC DISSENT OVER US MILITARY INTERVENTION IN CENTRAL AMERICA ALSO POINT IN THIS DIRECTION. THESE ARE IMPORTANT TRENDS, IN MY OPINION, FAR MORE IMPORTANT THAN THE NOW COMMON AMERICAN PARANOIA ABOUT THE FAR EAST, BECAUSE THESE ARE POSITIVE TRENDS OF POTENTIAL BENEFITS TO BOTH SIDES.

FURTHERMORE, THE CHARACTER OF TECHNOLOGY HAS ALSO CHANGED. IT IS FAR MORE INTERNATIONAL AND TECHNOLOGICAL DEVELOPMENT IS MORE MULTIPOLAR IN TERMS OF THE NUMBER OF DIFFERENT COUNTRIES PARTICIPATING IN GLOBAL TECHNOLOGY. NO LONGER IS THE US THE FOUNTAINHEAD OF NEW TECHNOLOGY AND INDEED JAPAN HAS ALREADY OVERTAKEN IT IN TERMS OF PATENTING ACTIVITY. AS A COROLLARY, TECHNOLOGY IS BECOMING INCREASINGLY VITAL TO THE COMPETITIVENESS OF INDIVIDUAL FIRMS AND THERE IS GROWING TALK ABOUT TOTAL

TECHNOLOGY PRODUCTIVITY, TOTAL QUALITY MANAGEMENT, INTEGRATED DESIGN ENGINEERING ETC. THE WORLD WITHIN WHICH AN INDIVIDUAL FIRM EXISTS HAS THEREFORE CHANGED TECHNOLOGICALLY - THERE ARE MORE OPTIONS, MORE THREATS, MORE OPPORTUNITIES, AND MORE OF A NEED TO TAKE TECHNOLOGY VERY SERIOUSLY REGARDLESS OF THE TECHNOLOGICAL CATEGORY. TECHNOLOGICAL "INTELLIGENCE" IS NOW A KEY TO SUCCESS AND GROWTH AND THERE IS INCREASING CONCERN WITH INTELLECTUAL PROPERTY RIGHTS, EVEN AMONG SMALL FIRMS.

THERE HAS BEEN ANOTHER CHANGE, THIS TIME FROM THE PERSPECTIVE OF THE THIRD WORLD. THIS HAS TO DO WITH HOW THE DEVELOPING WORLD VIEWED NEW TECHNOLOGY. ABOUT FIFTEEN OR TWENTY YEARS AGO, THE VIEW WAS A MIXTURE OF FEAR, MYSTIFICATION AND TENTATIVE OPTIMISM. THERE WAS CONCERN OVER INCREASED DEPENDENCY DUE TO THE TECHNOLOGICAL REVOLUTION, AND I SHARED THAT VIEW. AND THERE WAS TALK ABOUT THE POSSIBILITIES OF 'LEAPFROGGING' AND THE NEW TECHNOLOGIES BEING A PANACEA FOR THE THIRD WORLD. THESE HAVE CHANGED, PARTLY ASK A RESULT OF KNOWLEDGE ABOUT THE NATURE OF THESE NEW TECHNOLOGIES, AND PARTLY BECAUSE OF CHANGES IN THE THIRD WORLD ITSELF. THE MOST GLARING OF THESE CHANGES IS THE DIFFERENTIATION THAT HAS OCCURRED MAINLY AS A RESULT OF THE TREMENDOUS SUCCESS OF THE ASIAN NICS, AND NOW OF THE SECOND TIER NICS, ON THE ONE HAND, AND THE DEBT BURDEN OF LATIN AMERICA AND AFRICA ON THE OTHER. THE NEW CATEGORIZATION IS PERHAPS WELL REPRESENTED IN A RECENTLY PUBLISHED STUDY BY THE OECD (DIETER ERNST AND DAVID O'CONNOR); THEY CLASSIFY COUNTRIES AS FOLLOWS:

FIRST TIER ASIAN NIE'S (KOREA, TAIWAN, SINGAPORE, HONG KONG)

SECOND TIER ASIAN NIE'S (MALAYSIA, THAILAND, PHILIPPINES)

FIRST TIER LATIN AMERICAN NIE'S (BRAZIL, MEXICO, ARGENTINA)

SECOND TIER LATIN AMERICAN NIE'S (CHILE, COLOMBIA, URUGUAY, VENEZUELA)

QUASI CONTINENTAL ECONOMIES (CHINA AND INDIA)

I HAVE FOUND THIS STUDY TO BE EXTREMELY REALISTIC WITH RESPECT TO THE OPTIONS AVAILABLE TO DEVELOPING COUNTRIES VIS A VIS NEW TECHNOLOGIES AND RECOMMEND IT STRONGLY.

ALSO, IN MANY COUNTRIES, THE ROLE OF THE PRIVATE SECTOR IS CHANGING. IN THE NICS, REGARDLESS OF THE GOVERNMENT INTERVENTION THAT MAY HAVE CONTRIBUTED TO THEIR SUCCESS, TODAY, THEY ALL HAVE POWERFUL AND VOCAL PRIVATE SECTORS (ALBEIT WITH DIFFERENT COMPOSITIONS) THAT ARE AGGRESSIVELY PURSUING CAREFULLY THOUGHT OUT STRATEGIES WITH RESPECT TO TECHNOLOGY DEVELOPMENT AND GROWTH. I DO NOT BELIEVE THAT THERE HAS EVER BEEN A TIME WHEN THE PRIVATE SECTORS OF THE DEVELOPING WORLD HAVE BEEN SO UNSHACKLED AND POWERFUL AND THIS HAS IMPORTANT IMPLICATIONS FOR THE ROLE OF THE STATE IN NEW TECHNOLOGY DEVELOPMENT AND POLICY.

FINALLY, AS THE NEW TECHNOLOGIES HAVE DEVELOPED, INTERNATIONAL AND DOMESTIC INDUSTRIAL STRUCTURES HAVE UNDERGONE MAJOR CHANGES. ENTIRE SUB-SECTORS HAVE DECLINED OR EMERGED (E.G. TV IN THE U.S.; CHIPS IN KOREA, ETC.), AND THE PATTERNS OF INDUSTRIAL RELATIONS HAVE ALSO CHANGED. THERE IS GREATER CONCERN WITH SUCH CONCEPTS AS STRATEGIC ALLIANCES, VERTICAL INTEGRATION VERSUS CONTRACTING; TECHNOLOGY SOURCING, NICHE MARKETING AND

TECHNOLOGY STRATEGY, ETC.

IT IS IN THE CONTEXT OF THESE CHANGES THAT I WOULD LIKE TO FOCUS ON A FEW SPECIFIC TRENDS THAT I BELIEVE TO HAVE THE MOST RELEVANCE TO INFORMATICS POLICY IN LATIN AMERICA. BUT FIRST, ALLOW ME TO SUMMARIZE THE MAIN ELEMENTS OF THIS NEW CONTEXT:

CHANGING PATTERNS OF STRATEGIC REGIONAL INTEREST AND POTENTIAL GROWTH

TECHNOLOGICAL MULTIPOLARITY

GROWING ROLE OF THE PRIVATE SECTOR

STRONGER KNOWLEDGE BASE ABOUT NEW TECHNOLOGY

DIFFERENTIATION WITHIN THE DEVELOPING WORLD

CHANGING INDUSTRIAL STRUCTURES.

I WOULD LIKE TO DISCUSS SOME SPECIFIC ISSUES THAT I BELIEVE TO BE ESPECIALLY PERTINENT IN THIS CONTEXT.

1. ROLE OF SMALL BUSINESS

AS I HAD MENTIONED, THE MAIN FOCUS OF IBD IS ON THE SMALL AND MEDIUM SIZED FIRM AND THERE IS A REASON FOR THIS FOCUS. IN TODAY'S COMPLEX GLOBAL ENVIRONMENT, THERE IS AN INCREASING NEED FOR SMALL FIRMS TO BECOME COMPETENT PLAYERS. THEY ARE OFTEN THE SOURCES OF INNOVATIVE TECHNOLOGY AND OFTEN ARE THE KEY ACTORS BEHIND TECHNOLOGICAL ADVANCES ASSOCIATED WITH LARGE FIRMS. THIS IS PARTICULARLY TRUE IN INFORMATICS, WHERE MANY OF THE MAJOR ADVANCES HAVE ORIGINATED IN SMALLER START UP ENTERPRISES. THEY ARE ALSO A MAJOR SOURCE OF EMPLOYMENT AND TAX REVENUES. ON THE OTHER HAND, THEY OFTEN SUFFER FROM A SHORTAGE OF CAPITAL AND MANAGEMENT SKILLS AS WELL AS THE CORPORATE RESOURCES TO BE

EFFECTIVE IN INTERNATIONAL BUSINESS.

IN DEVELOPING COUNTRIES, MOST FIRMS ARE WHAT WOULD BE TERMED SME'S, THOUGH THERE ARE, ADMITTEDLY, SOME VERY LARGE THIRD WORLD CORPORATIONS. HOWEVER, THESE FIRMS SUFFER FROM ALL THE DRAWBACKS ASSOCIATED WITH SME'S IN THE INDUSTRIALIZED WORLD, ONLY MORE ACUTELY. AS SUCH, THERE IS A NEED FOR SUPPORT SYSTEMS AND PROGRAMS TO ENCOURAGE THE PROPER DEVELOPMENT OF THESE FIRMS. THIS WOULD CONTRIBUTE TO OVERALL TECHNOLOGICAL AND INDUSTRIAL DEVELOPMENT, AS WELL AS TO THE GENERATION OF EMPLOYMENT AND INCOME.

2. TECHNOLOGY SOURCING, INTELLIGENCE AND ACQUISITION

AS MENTIONED EARLIER, THE WORLD IS NOW CHARACTERIZED BY AN INCREASING TECHNOLOGICAL MULTIPOLARITY, IN THE SENSE OF AN INCREASING NUMBER OF SOURCES OF NEW TECHNOLOGICAL ADVANCE. ADMITTEDLY, IN SOME MAJOR AREAS, SUCH AS SUPERCONDUCTIVITY, THE EXPERTISE IS STILL NARROWLY CONCENTRATED, BUT FOR THE MAJORITY OF NEW PRODUCT AND PROCESS INNOVATIONS, THE NUMBER OF SOURCES IS GROWING.

INDEED, ONE CAN SPEAK OF AN EMERGING TECHNOLOGY MARKETPLACE, WITH ALL THE ATTRIBUTES OF A TYPICAL MARKET - BUYERS AND SELLERS OF TECHNOLOGY, BROKERS, INCREASING INFORMATION, EMERGENCE OF PRICING MECHANISMS, ETC. WHAT THIS IMPLIES OF THE DEVELOPING WORLD IS THAT THERE IS THE POSSIBILITY OF PARTICIPATING IN THIS MARKETPLACE. ADMITTEDLY, IN THE PAST, A MAJOR ISSUE FOR DEVELOPING COUNTRIES WAS THE RESTRICTED ACCESS TO NEW TECHNOLOGY. BUT THIS CAN CHANGE, IF DEVELOPING COUNTRIES HAVE THE WILL TO

PURSUE THESE OPPORTUNITIES. THE GROWING BODY OF EXPERIENCE IN THE INDUSTRIALIZED NATIONS MAY PROVE USEFUL. SEVERAL LARGE CORPORATIONS IN THE U.S. FOR EXAMPLE, HAVE ESTABLISHED THEIR OWN CORPORATE TECHNOLOGY SOURCING UNITS. ALSO, GOVERNMENT AGENCIES IN MANY COUNTRIES ARE CONSIDERING DOING SOME FORM OF TECHNOLOGY MONITORING.

ON THE OTHER HAND, THERE ARE A NUMBER OF PUBLICATIONS, SUCH AS NEW SWEDISH TECHNOLOGY, ITALIAN TECHNOLOGY, NEW TECHNOLOGY JAPAN, THAT PROVIDE UP TO DATE INFORMATION ON NEW DEVELOPMENTS BY INDUSTRY IN THEIR RESPECTIVE COUNTRIES. NORMALLY, THESE ARE FREE PUBLICATIONS AND CAN BE A VALUABLE SOURCE OF INFORMATION.

IN ADDITION, THERE ARE A NUMBER OF TECHNOLOGY CLEARING HOUSES AND BROKERS: KISER RESEARCH, INC. FOR EASTERN EUROPE, YANASE AND ASSOCIATES FOR JAPAN, TECHNOLOGY CATALYSIS, TECHNICAL INSIGHTS, ETC. THESE ARE COMMERCIAL ORGANIZATIONS THAT SPECIALIZE IN THE TECHNOLOGY MARKETPLACE.

FINALLY, THERE ARE PROFESSIONAL SOCIETIES, SUCH AS THE LICENSING EXECUTIVES SOCIETY, MEMBERSHIP IN WHICH CAN PROVIDE AN EXCELLENT OPPORTUNITY FOR NETWORKING AROUND THE WORLD WITH PROFESSIONALS CONCERNED WITH TECHNOLOGY MONITORING, ACQUISITION AND INTELLIGENCE.

FOR LATIN AMERICA, IT WOULD SEEM THAT A REGIONAL TECHNOLOGY INTELLIGENCE UNIT OR MECHANISM WOULD MAKE A MAJOR DIFFERENCE TO THE COUNTRY'S ACCESS TO NEW TECHNOLOGY. THE DETAILS OF SUCH A MECHANISM WOULD NEED TO BE WORKED OUT, BUT THE KNOWLEDGE BASE EXISTS AND IT CAN BE DONE.

3. TECHNOLOGY INCUBATORS:

ONE OF THE MAJOR NEW TRENDS IN APPROACHES TO TECHNOLOGY DEVELOPMENT AND COMMERCIALIZATION IS WHAT IS DEEMED A "TECHNOLOGY INCUBATOR." THESE ARE TYPICALLY ASSOCIATED WITH A MAJOR UNIVERSITY OR RESEARCH INSTITUTE. ESSENTIALLY, AN INCUBATOR PROVIDES A LOW COST (OFTEN SUBSIDIZED) ENVIRONMENT FOR THE START-UP OF A NEW TECHNOLOGY BASED BUSINESS. OFTEN, THE SCENARIO IS ONE WHERE A UNIVERSITY FACULTY MEMBER OR RESEARCHER WHO HAS DEVELOPED A PRODUCT OR PROCESS MOVES INTO AN INCUBATOR AND CREATES A BUSINESS BASED UPON HIS DISCOVERY. THE INCUBATOR REDUCES MANY OF THE RISKS, COSTS AND UNCERTAINTIES ASSOCIATED WITH THE START-UP PHASE. PLUS IT PROVIDES ACCESS TO TECHNICAL, MANAGERIAL, MARKETING AND FINANCIAL ASSISTANCE.

IBD HAS BEEN EXPLORING INCUBATORS IN A NUMBER OF COUNTRIES - THAILAND, MEXICO, THE PHILIPPINES, ETC. INCUBATORS CAN BE EFFECTIVE MECHANISMS FOR TECHNOLOGY DEVELOPMENT IN DEVELOPING COUNTRIES AND CAN BE BASED NEAR A UNIVERSITY, SO AS TO TAKE ADVANTAGE OF THE RESOURCES THERE. THE SPECIFIC TECHNOLOGIES THEMSELVES CAN BE SOURCED FROM OVERSEAS AND PERHAPS THE BUSINESS ENTITY WOULD BE A JOINT VENTURE BETWEEN A FOREIGN AND LOCAL FIRM.

THERE IS AN EXTENSIVE RANGE OF EXPERIENCE WITH INCUBATORS IN THE U.S. AND OVERSEAS. THE UNDP HAS ALSO BEEN EXPLORING THE CONCEPT AND FUNDING FEASIBILITY STUDIES IN A NUMBER OF COUNTRIES. IBD HAS DRAWN UP BUSINESS PLANS FOR A VARIETY OF DIFFERENT TYPES OF PUBLIC AND PRIVATE INCUBATORS.

IN LATIN AMERICA, THE POTENTIAL VALUE OF AN INFORMATICS TECHNOLOGY INCUBATOR, OR NETWORK OF INCUBATORS, COULD BE SIGNIFICANT. THE COSTS INVOLVED ARE LOW, AND IF PROPERLY STRUCTURED, THE PROJECT COULD BE SELF-FINANCING. WHAT WOULD BE NEEDED IS AN INITIAL SMALL SUBSIDY TO GET THE PROJECT OFF THE GROUND.

THE RESOURCES FOR SUCH AN EXERCISE ARE AVAILABLE AND DIVERSE. THERE IS AN INTERNATIONAL BUSINESS INCUBATOR ASSOCIATION IN THE U.S. SEVERAL GROUPS SPECIALIZE IN THE DESIGN AND OPERATION OF INCUBATORS IN THE U.S., ENGLAND, FRANCE, AUSTRALIA, ETC. THERE IS A LARGE BODY OF LITERATURE NOW AVAILABLE AND THE U.N. SYSTEM ITSELF HAS BEEN DEVELOPING PROGRAMS IN THIS AREA.

4. STRATEGIC ALLIANCES & NETWORKING:

THE VALUE OF IDENTIFYING THE PROPER PARTNERS TO WORK AND COLLABORATE WITH IS SUBSTANTIAL IN TODAY'S COMPLEX AND CHANGING WORLD. WHETHER IT BE FOR JOINT PRODUCT DEVELOPMENT, JOINT VENTURES, TECHNOLOGY LICENSING AND TRANSFER, COUNTER-TRADE AND COUNTER-DISTRIBUTION, BEING WELL NETWORKED WITH RELEVANT GROUPS AND INDIVIDUALS AROUND THE WORLD IS ESSENTIAL FOR SUCCESS.

THIS IS PARTICULARLY IMPORTANT FOR DEVELOPING COUNTRIES, WHICH TEND TO HAVE INDUSTRIES AND FIRMS THAT ARE SOMEWHAT REMOVED FROM THE MAINSTREAM OF GLOBAL TECHNOLOGICAL INTERACTIONS AND DEVELOPMENTS. YET, THROUGH A CAREFUL AND TARGETED STRATEGY OF ALLIANCE BUILDING AND NETWORKING, DEVELOPING COUNTRIES CAN CARVE OUT AND TAKE ADVANTAGE OF SPECIAL AREAS OF OPPORTUNITY TO THEIR

BENEFIT.

FOR EXAMPLE, THE POSSIBILITY OF ENTERING INTO STRATEGIC ALLIANCES WITH A CORPORATION FROM INDUSTRIALIZED COUNTRIES, OR FROM OTHER DEVELOPING COUNTRIES CAN BE OF MAJOR VALUE. VERY OFTEN, A FIRM IN A DEVELOPING COUNTRY MAY HAVE A COMPETITIVE EDGE IN A SPECIFIC PRODUCT OR COMPONENT, BUT LACK THE MARKETING CAPACITY WHICH COULD BE PROVIDED BY THE RIGHT TYPE OF PARTNER.

THERE IS A WEALTH OF LITERATURE NOW AVAILABLE ON STRATEGIC ALLIANCES AND NETWORKING. SOME OF THE MORE IMPORTANT RECENT WORK IN STRATEGIC MANAGEMENT FOCUSES ON HOW TO IDENTIFY AND DECIDE UPON COLLABORATION WITH OTHER FIRMS. IN PRACTICE, MANY SOUTH EAST COMPANIES HAVE ENTERED INTO COOPERATIVE ARRANGEMENTS WITH U.S. AND EUROPEAN FIRMS.

THE BASIC PREMISE IN DECIDING UPON THE APPROPRIATE FORMS COOPERATION DERIVES FROM AN ANALYSIS OF THE CORE AND COMPLIMENTARY ASSETS OF A FIRM. IF IT IS STRONG IN TECHNOLOGY, BUT WEAK IN MARKETING, THEN THE SEARCH NEEDS TO BE FOR A PARTNER THAT IS STRONG IN MARKETING. IN THE PAST, MANY FIRMS HAVE MISTAKENLY LOOKED FOR PARTNERS THAT ARE SIMILAR TO THEM, RATHER THAN COMPLIMENTARY TO THEIR OWN STRENGTHS. IN THIS REGARD, AN ANALYTICAL EXERCISE TO ASSESS ONE'S OWN "ASSETS" IN TERMS OF FUNCTIONAL AND CORE CAPABILITIES IS NEEDED.

ON A BROADER LEVEL, NETWORKING ON AN ONGOING BASIS IS IMPORTANT, BOTH TO ASSIST IN THE SELECTION OF PARTNERS AND TO BE ABLE TO TAP INTO CHANNELS OF INFORMATION SO AS TO BE UP-TO-DATE WITH RESPECT TO KEY DEVELOPMENTS INTERNATIONALLY. THERE ARE A

NUMBER OF MECHANISMS IN PLACE WHICH COULD SUPPORT SUCH NETWORKING, INCLUDING BILATERAL EXCHANGE PROGRAMS, TRADE MISSIONS,
CONFERENCES, ETC. IN THE AREA OF IMFORMATICS, IT WOULD SEEM SENSIBLE FOR SUPPORT TO BE PROVIDED TO INDIVIDUALS FROM LATIN AMERICA TO VISIT IMPORTANT INDUSTRY SHOWS (E.G. COMDEK) AND TO ATTEND MAJOR INDUSTRY SPECIFIC CONFERENCES. THE RETURNS FROM THE MINOR INVESTMENT REQUIRED FOR THESE ACTIVITIES CAN BE CONSIDERABLE.

THE IMPORTANCE OF ALLIANCES AND OTHER FORMS OF COOPERATION IS HIGHLIGHTED BY THE RECENT REPORT OF THE IC2 INSTITUTE AT THE UNIVERSITY OF TEXAS. THIS REPORT LISTS A VARIETY OF NEW FOCUS OF COLLABORATION BETWEEN FIRMS, GOVERNMENT AND UNIVERSITIES FOR SUCH PURPOSES AS JOINT TECHNOLOGY DEVELOPMENT, COMMERCIALIZATION, BUSINESS INCUBATION, ETC. IT MAY BE WORTHWHILE FOR THE APPROPRIATE LATIN AMERICAN ORGANIZATIONS TO SEEK PARTICIPATION IN THESE ARRANGEMENTS, AGAIN BASED ON NATURAL STRENGTHS AND COMPLIMENTARIES.

5. CONTRACT MANUFACTURERS

IN RECENT YEARS MANY DEVELOPING COUNTRIES HAVE BENEFITED FROM THE PROMOTION AND DEVELOPMENT OF CONTRACT MANUFACTURING CAPABILITIES OF LOCAL FIRMS, EITHER TO SUPPLY OVERSEAS CUSTOMERS OR FOREIGN COMPANIES WITH LOCAL OPERATIONS. THERE ARE A NUMBER OF ISSUES RELATED TO CM. IN THE FIRST INSTANCE, IT OFFERS THE POSSIBILITY FOR A DEVELOPING COUNTRY FIRM TO CAPITALIZE ON ITS STRENGTHS AND ADVANTAGES (E.G. LOW COST LABOR, MODERATE

MANUFACTURING CAPABILITY) FOR EXPORT PURPOSES. IT ALSO CREATES A SITUATION WHERE FAVORABLE TECHNOLOGY TRANSFGER CAN OCCUR, FOR EXAMPLE WHEN THE CUSTOMER PROVIDES TRAINING AND EQUIPMENT TO THE CONTRACT MANUFACTURER. FURTHERMORE, IT ENABLES THESE FIRMS TO CAPITALIZE ON THOSE SPECIFIC "NICHE" MARKETS IN THE INTERNATIONAL DIVISION OF LABOR AND MANUFACTURING WHERE THEIR STRENGTHS CAN BE BEST USED.

ON THE OTHER HAND, THERE ARE PROBLEMS ASSOCIATED WITH CM. IN MANY CASES, FOREIGN FIRMS ARE RELUCTANT TO SOURCE COMPONENTS LOCALLY BECAUSE OF CONCERNS OVER QUALITY AND DELIVERY SCHEDULES ETC. ALSO, OFTEN THE LOCAL SUPPLIER BASE IS WEAK IN TERMS OF ITS MARKETING TO POTENTIAL CUSTOMERS AND TAKING ADVANTAGE OF THE POTENTIAL CUSTOMER BASE REPRESENTED BY FOREIGN FIRMS WITH LOCAL OPERATIONS.

HOWEVER, THIS WEAKNESS CAN BE OVERCOME THROUGH TRAINING PROGRAMS DESIGNED TO HELP LOCAL FIRMS BECOME BETTER SUPPLIERS AND BETTER MARKETERS OF THEIR CAPABILITIES.

AGAIN, THERE IS A SIZEABLE BODY OF LITERATURE AND EXPERIENCE THAT CAN BE DRAWN UPON TO DEVELOP PROGRAMS TO IMPROVE THE CM CAPABILITY OF LATIN AMERICAN COUNTRIES IN THE INFORMATION INDUSTRY. IBD IS CURRENTLY WORKING INTENSIVELY IN THIS AREA (SEE ATTACHED ISSUES PAPER) WITH U.S. FIRMS AS THE PRIMARY FOCUS, BUT THESE LESSONS CAN BE EXTRAPOLATED TO FIRMS IN DEVELOPING COUNTRIES. INDEED, THE DEVELOPMENT ASSISTANCE COMMUNITY IS ALREADY RECOGNIZING THE IMPORTANCE OF CM (OR "BACKWARD LINKAGES") AND SEVERAL LARGE PROJECTS ARE NOW BEING DEVELOPED BY AID AND THE WORLD BANK IN THIS AREA.

IT WOULD SEEM SENSIBLE AND OPPORTUNE FOR LATIN AMERICAN COUNTRIES TO CONSIDER VARIOUS MEASURES TO IMPROVE THEIR PARTICIPATION IN THE INTERNATIONAL MARKET THROUGH CM.

6. BUSINESS SUPPORT SERVICES AND SYSTEMS

THE FINAL SPECIFIC SUGGESTION THAT I WOULD LIKE TO MAKE HAS TO DO WITH BUSINESS SUPPORT SYSTEMS FOR SME'S.

INCREASINGLY, AS SME'S IN INDUSTRIALIZED COUNTRIES AND IN DEVELOPING COUNTRIES BECOME MORE ACTIVE PARTICIPANTS IN INTERNATIONAL BUSINESS, THEY ENCOUNTER MANY OF THE TYPICAL PROBLEMS ASSOCIATED WITH THEIR SIZE AND RELATIVE LACK OF EXPERIENCE. FOR EXAMPLE, A TYPICAL FIRM MAY SPEND SEVERAL MONTHS, OR YEARS, IN INCURRING SUBSTANTIAL EXPENSES PRIOR TO DECIDING TO DO BUSINESS IN A PARTICULAR COUNTRY. THEY OFTEN LACK ADEQUATE KNOWLEDGE OF THE BUSINESS ENVIRONMENT, RULES AND REGULATIONS ETC. AND MUST LEARN THESE FROM SCRATCH. THEY ALSO GENERALLY START OFF WITHOUT ANY CONTACTS WITH LOCAL FIRMS, GOVERNMENT AGENCIES AND SERVICE PROVIDERS (LAWYERS, ACCOUNTANTS, FREIGHT HANDLERS, ETC.).

IN RESPONSE TO THIS NEED, THE CONCEPT OF A "ONE STOP" CENTER WHICH COULD PROVIDE A VARIETY OF SERVICES TO FOREIGN FIRMS SEEKING TO DO BUSINESS THERE, IS BECOMING MORE POPULAR. THESE SERVICES WOULD INCLUDE SHORT TERM OFFICE SPACE AND CONFERENCE FACILITIES, ASSISTANCE IN GOVERNMENT CLEARANCES ETC. INFORMATION ON THE LOCAL BUSINESS ENVIRONMENT, ACCESS TO EXPERTS AND SERVICE PROVIDERS AND CONTACTS WITH APPROPRIATE LOCAL PARTNERS.

THE SERVICE CAN WORK BOTH WAYS. IT CAN EASE ENTRY BY FOREIGN FIRMS AND ALSO BE A "WINDOW" FOR LOCAL FIRMS SEEKING TO DO BUSINESS OVERSEAS. SUCH A SYSTEM WOULD HOPEFULLY PROMOTE

JOINT VENTURES AND OTHER COLLABORATIONS WHICH IN TURN CAN LEAD TO TECHNOLOGY AND INDUSTRIAL DEVELOPMENT.

THERE IS SOME EVIDENCE THAT SUCH SUPPORT CENTERS CAN FUNCTION PROFITABLY AND NOT REQUIRE SUBSIDIZATION. FORMS OF THIS CONCEPT ALREADY EXIST IN JAPAN, THAILAND, PHILIPPINES AND OTHER COUNTRIES. IN LATIN AMERICA, CONSIDERATION COULD BE GIVEN TO THE ESTABLISHMENT OF SUCH CENTERS AT THE NATIONAL OR REGIONAL LEVELS AS A MECHANISM TO PROMOTE INTERNATIONAL BUSINESS AND TECHNOLOGY TRANSACTIONS BETWEEN THE REGION AND THE REST OF THE WORLD.

CONCLUSION

THESE ARE SOME OF THE KEY ISSUES THAT I WOULD LIKE TO BRING TO YOUR ATTENTION AND CONSIDERATION. THEY ARE ALL OF PRESSING IMPORTANCE IN THE INDUSTRIALIZED COUNTRIES, BUT HAVE IMMEDIATE AND STRONG IMPLICATIONS AND POLICIES IN DEVELOPING COUNTRIES. IN SOME WAYS, THESE ARE ISSUES THAT HAVE ARISEN AS A RESULT OF THE IMMEDIATE AND PRACTICAL PROBLEMS FACED BY FIRMS IN THE U.S. AND OTHER INDUSTRIALIZED NATIONS BUT SHOULD BE SEEN AS OFFERING GUIDANCE TO THE TYPES OF TARGETED POLICIES AND STRATEGIES THAT WOULD BE MOST SENSIBLE FOR LATIN AMERICAN NATIONS SEEKING TO OPTIMIZE THEIR PARTICIPATION IN THE GLOBAL INFORMATICS AND HIGH TECH. MARKET AND TO GAIN THE MAXIMUM BENEFIT FROM THIS.

THE WORLD HAS CHANGED DRAMATICALLY, AND I BELIEVE FOR THE BETTER. AS WE STAND AT THE BEGINNING OF THE 1990'S, THERE IS A WORLD OF NEW OPPORTUNITY OPENING ESPECIALLY FOR THOSE COUNTRIES THAT WERE NOT ABLE TO BENEFIT FROM THE 1980'S. NOT ONLY HAS THE

ECONOMIC SITUATION CHANGED, WITH NEW ACTORS AND NEW SCENARIOS OF STRENGTH, BUT THE POLITICAL CLIMATE HAS ALSO CHANGED FOR THE BETTER IN MANY INSTANCES, THUS SETTING THE STAGE FOR GROWTH AND POSITIVE DEVELOPMENT IN LATIN AMERICA. I AM OPTIMISTIC ABOUT THE FUTURE, THOUGH I APPRECIATE THE SPECIFIC TURBULENT POLITICAL AND ECONOMIC PROBLEMS FACING LATIN AMERICAN TODAY. MY HOPE THOUGH IS THAT THIS WILL CHANGE, AND CHANGE SOON. AND WITHOUT MEANING TO SOUND LIKE A UNCRITICAL BELIEVER IN TECHNOLOGY AS THE SOLUTION TO ALL PROBLEMS, I BELIEVE THAT A CAREFUL, INTELLIGENT AND WELL ANALYZED APPROACH TO TECHNOLOGY CANNOT FAIL TO LEAD TO POSITIVE RESULTS.

THANK YOU.