EXPLORING NOVEL METHOD FOR RURAL DEVELOPMENT USING ICT

CHAPTER 2
LITERATURE REVIEW

2.1 Introduction

India's improvement design throughout the final ten and a half years is notable when contrasted with other improving countries as it has gotten a remarkably noticeable member in the savvy capital-driven qualified information innovation (IT) benefits industry. Since the 1990s India has been one of the quickest developing economies on the planet. It is expected that by 2050, India will end up being the third biggest economy on the planet, behind China and the USA.

The report predicts that India's horrible domesticated item (GDP) will surpass that of Italy and France by 2020, Germany and Japan by 2035. The excuse for why India's infrastructure is diverse might stem from the nature of the informative content correspondence innovation (ICT) industry and the opportunity it has liked from government regulation to advance this industry.

ICT is the amalgamation of machines, telecom, conveyance innovations and databases empowered by computerized hardware. This theory inspects how India improved its ICT proficiencies and speaks for diverse points of view on India's improvement. For instance, one section inspects how India built discriminating linkages with the US ICT industry in the 1990s. That relationship is thought to have played a connote cant part in the quick growth of India's ICT industry. Another part researches India's procedure to improve ICT associations in a specific sub-national area of India, Bangalore in the state of Karnataka, and demonstrates how it paid off by connecting individuals in the state to the outer universe of informative data and information through ICT dispersion.

This thesis also infuses new knowledge into a highly visible and often controversial debate going on in the USA currently regarding outsourcing jobs to India and other countries. They provide new knowledge regarding what has really happened to India’s economic development as opposed to what one hears in the media. Finally, it reveals new insights regarding the complex process of globalization by showing how
the generation and circulation of intellectual capital in the USA and India in ICT has led to greater productivity in the USA while facilitating the economic development of India.

2.2 Indian Economic Development and ICT

There is a long and complex writing on the hypotheses and practice of financial infrastructure at the national, commonplace, local and nearby levels. While the goal of this part is to survey the standard of this literary works is an effort to help set the stage for an examination of the Indian development experience, it is not possible to do full justice to the topic in a short study such as this. Consequently, we have necessarily focused on major theoretical concepts and planning applications dating from the middle part of the 20th century when India moved from colonial status to independence.

In the mid-20th Century, as today, staging was a central assumption of most approaches to development planning. For example, it was at this time that Rostow formulated the five-stage model of economic development (1960). At about the same time Perroux (1950) formulated growth pole theory later popularized in English by Higgins and Savoie (1988) and by Hirschman (1958) who ignited a debate that still continues in some quarters regarding balanced versus unbalanced approaches to growth. Later in the 1970s the export promotion model emerged as several small countries in Asia (Taiwan, Hong Kong, Singapore and Korea) successfully deployed this strategy originally developed by Japan in the 1960s. Throughout this time supply side or infrastructure efforts were ever present.

This approach included social overhead investments such as in human capital (education and training) but the primary focus was on hard infrastructure. As these models were unfolding in concept and practice through different applications around the world, India set off on an independent course. It began with a strategy of autocracy and what appeared as the simultaneous development of all economic sectors. It did this by using its large internal market as the driver. In short, it adopted balanced growth strategy focused on its large internal market.

As such it was, in contemporary terms, a massive commitment to an endogenous model for its development strategy. In the 1950s this was exceptionally
contrary to prevailing thought. At the same time as these theories and their application were occurring neoclassical economic growth theory was mostly silent.

It offered little beyond the notion that growth and development are largely functions of labour and capital factor price differentials, that is, comparative advantage among countries and/or regions. Yet, Tinbergen (1959) and later Solow (1956) around the mid-century showed that factor price differentials explained at best about half of the variance in economic growth. Further, Denison’s (1967) empirical work on the impact of education and human capital on economic growth suggested that this was an underappreciated dimension but no linkage or conclusion was identified. These findings begged for further theoretical development. Solow argued that much of the residual variance was due to technological change.

However, it was not until the mid-1980s that growth theory advanced much beyond the so low interpretation. ‘New growth theory’, as it is now called, argued that the technology variable was indeed important but that technological change and the ability to innovate was increasingly dependent on human capital. But this ability is often local, that is, endogenous, and thus a phenomenon that varies with local conditions such as leadership, labour force characteristics, innovation patterns and institutional capacity. Most development plans today focus increasing attention on local, regional and national institutions, and thus endogenous growth concepts.

In this chapter the focus of the analysis begins with a description and assessment of Rostov’s stage theory of economic growth. This is followed by an assessment of growth pole theory and export promotion concept. The final part of the chapter presents a short assessment of the current Indian development effort within which endogenous growth concepts are discussed. The supply side and new growth theory approaches are examined as embedded elements in the assessments of the various growth models.

This study is important because of the nature of the Indian development experience. First, in an overall sense India’s approach to independence was, on a grand scale, endogenous in nature as India tried to develop on the basis of its internal market. Thus it adopted an approach that was contrary to the export promotion approach as well as many other models. Second, after some 40 years of five-year development plans built
around a largely supply-side and import substitution approach, it developed a globally competitive information technology services industry that has continued to grow and remain competitive. From the perspective of a staged model of growth thesis not an expected outcome.

In short, developing a competitive higher-end services industry is not seen as a likely or even a possible outcome until a country develops export competitive industries in agriculture, low to higher-end manufacturing and services, and creates advanced infrastructure. While it is certainly the case that India has, since the early 1990s, adopted a stronger market- and export-promotion-oriented approach to development with some success, the rapid increase in information technology (IT) exports that began in the late 1980s cannot be attributed to the early 1990s’ liberalization policies. So the question remains, what have been the building blocks leading to the ‘leapfrog’ activity leading to IT-oriented economic development?

2.3 Stages of growth theory

2.3.1 Introduction:

The financial growth hypotheses of the 1950s and early 1960s saw the procedure of advancement as a progression of successive phases of investment development through which all nations must pass (Tovar, 1994, 68). The aforementioned hypotheses were dependent upon the thought that having the right amount and mixture of certain variables for example reserve funds, speculation and remote support was a sufficient condition for improving nations to continue along the way emulated by improved nations (Tovar, 1994, 68).

The hypothesis of investment development by Rostow (1960) is a case of a direct stage model. As per Rostow, the move from underdevelopment to improvement could be seen or grasped as a succession of stages that all nations must go before through (Tovar, 1994, 70; Franco, 1999, 17).
2.3.2 Rostow’s Argument

In the any time that was spent financial improvement, as per Rostow: It is conceivable to recognize all social norms, in their monetary extents, as lying inside one of five classes: the universal public order, the preconditions for take-off into self-standing by development, the take-off, the head to development, and the time period characterized by towering mass utilization These stages are not simply elucidating. They have an inward coherence and congruity they constitute, toward the finale, a speculation about financial development and a more general, if still quite incomplete, hypothesis about current history overall (Rostow, 1960, 1–12; Tovar, 1994, 70).

The universal social order works inside restricted handling capacities. Its centremost characteristic is a roof on the level of the feasible yield for every head. This is emulated by the foundation of preconditions in a time of move where the conventional public order is changed to empower it 'to abuse the foods grown from the ground of current science, to battle off reducing returns, and hence to revel in the commandments and decision opened up by the walk of compound interest' (Bauer, 1972, 15).

The take-off stage happens 'when the old pieces and the resistances to consistent development are beyond any doubt overcome development comes to be its ordinary condition' (Bauer, 1972, 478). In this period 'new ambitious men approach, eager to go out on a limb in chase for profit' (Hunt, 1989, 97). Rostow accepted that the ‘take-off’ might be prompted by the activation of domesticated and outside funds so as to produce sufficient venture to quicken investment development. Rostow maintained that when an economy increased its savings rate above 10 per cent it would be able to pass from take-off to self-sustaining growth (Behrman and Srinivasan, 1988, 2112). In fact, Rostow believed that ‘capital constraint’ was the main obstacle to economic development (Tovar, 1994, 73; Franco, 1999, 17).

Rostow’s central proposition is the ‘take-off’ to sustained development. He defines it as an industrial revolution driven by radical change. That is, in this stage a leading industry with sufficient forward and backward linkages expands and spreads its effects to the whole economy and in so doing prepares the way for additional
Industrial expansion (Mason, 1982, 118). The take-off is followed by the drive to maturity, which is completed when maturity is achieved (in Rostow’s view, some 60 years after take-off begins the cosmetics of the economy updates unceasingly as methods enhance, new organizations quicken, more advanced in years businesses level off. The economy gems its place in the global economy: merchandise once in the past transported in are prepared at home; new import necessities improve, and the new fare wares to match them… [In this stage] …an economy exhibits the ability to move past the definitive commercial ventures (Bauer, 1972, 478). Rostow, along with Schumpeter and Hirschman, viewed the economy as being in continuous disequilibrium, rising only to fall as other ‘production functions’ take their place.

In the ‘drive to maturity’ there is considerable similarity in concept between Rostow’s successive production functions and Schumpeter’s ‘creative destruction’ (Mason, 1982, 123).

Finally, the age of high mass consumption comes ‘where in time, the leading sectors shift towards durable consumer’s goods and services; a phase from which Americans is beginning to emerge’ (Bauer, 1972, 479) in the 1970s.

Rostow believed that while all the progressed nations had passed the phase of take-off into the self-maintaining development, undeveloped nations were still in the ‘traditional society’ or "preconditions" stage. Subsequently, under advanced nations needed to accompany certain tenets of advancement to take off into self-standing by development (Tovar, 1994, 70). In short, there is a decently characterized example of advancement that ought to be followed by undeveloped nations.

For instance, with a specific end goal to pass into the take-off stage a country would need to raise investment to a minimum of 10 per cent of national income, develop leading high-growth sectors, and create a supportive institutional framework and infrastructure (Hung-Chao, 1991, 896–7). ‘Once these conditions are met, a nation can achieve “sustained, self-sustaining growth” leading eventually to great wealth’ (Hung-Chao, 1991, 897).
2.3.3 Critique of Rostow’s Stage Theory

Rostow’s theory had many shortcomings, however, as many countries viewed Rostow’s stages as a basis for the analysis of problems of development and for policy prescriptions such as ‘aid-financed investment’ policies promoted by the World Bank. He believed that Western nations could provide Third World countries with aid to fill the ‘financing gap’ between the necessary investments for take-off and national savings.

Currently, however, extensive literature and country-based evidence, such as from Latin America and Africa, show that more savings and investments are not sufficient conditions for high growth (Hunt, 1989, 107; Easterly, 2002, 34–5).

2.3.4 Savings and investment alone are not sufficient

Rostow claimed that a crucial factor that serves to lift an economy toward a sustained growth path is a significant increase in the share of savings and investment in national income. The proposed rate of 10 per cent appears simplistic, in hindsight, since many countries have more than satisfied this criterion but have not ‘taken off’ (Behrman and Srinivasan, 1988, 2112). Many countries referenced by the World Bank (1993) as having a savings rate much higher than 10 per cent have yet to enter into a period of sustained growth (Behrman and Srinivasan, 1988, 2112).

Furthermore, Rostow’s theory, like many other Western-based economic theories, assumed the existence of necessary factors but failed to take into account the particular set of conditions in a country.

For investment to work and generate economic growth, a country must possess the necessary structural and institutional conditions, that is, well-integrated commodity markets, money markets, infrastructure facilities, established and enforced property rights and so on (Tovar, 1994, 73, 84). Solow and more recently the new growth theoreticians have argued that capital cannot be the ultimate source of growth, but that technology and endogenous growth conditions are also necessary (Malecki, 1997; Easterly, 2002, 69).
2.4 Influence of public policies:

Linear-stage theories maintain that ‘a chain of causality runs from the mode of production within a given society’ to economic development and growth (Mason, 1982, 118). This means that there is a unique ladder of ascent confronting each society.

However, there are some factors that influence the advancement process: a nation's asset enrichments and size, its open strategies and targets, its establishments, the accessibility of capital and innovation, the global nature and the presence of skilled labour. Under this rationale the state acts only in subordinate ways in that it only affects the outcome in a secondary way.

However, there are cases where public policies have deeply influenced the process of growth in ways that were not historically inevitable (Mason, 1982, 119–120). An efficient government that possesses the ability to plan and administer development projects can make a difference in outcomes. South Korea is an example. Contrary to South Korea, however, is India, where many economists attribute and agree that a large measure of blame for stagnant economic growth in the past is due to both bureaucracy and faulty development policies including excessive protection via industrial licensing (Mason, 1982, 131).

Rostow claimed that his model both explained the course of economic history and produced predictions for the future that, in turn, could serve as bases for far-reaching and appropriate policies. His theory suggests that there are a small number of readily discernible critical variables (which he vaguely described) to resolve the problem of economic development. However, simple models and loosely defined variables cannot effectively serve to guide solutions to the complex problems often found in developing countries (Bauer, 1972, 482).

Experience with economic development strategy and policy in many Third World countries over the past few decades shows how far from reality this approach can be.
1. Manufacturing is a necessary condition

Manufacturing is both a definition and condition of economic progress for Rostow. The assembling segment sets in movement 'a chain of further current area necessities and its development gives the possibility of outside economy impacts, mechanical in character' (Bauer, 1972, 485). Thus, the Rostow view proposes that manufacturing activity is a necessary condition for continued economic advancement. However, the case of India raises doubts as it may be argued that India passed, in part, from an agricultural society to a service society without developing a strong export-based manufacturing sector.

2. Neglect of social, cultural, psychological and institutional factors

Rostow places great emphasis on the growth of inputs, particularly capital accumulation, and in the allocation of resources as the primary sources of economic growth. At the same time, he neglects cultural, social and psychological factors that influence human economic behaviour (Mason, 1982, 121). Many scholars have argued that the impressive economic growth of East Asian Countries cannot be totally explained without considering specific cultural attributes and values such as thrift and hard work promoted by Confucianism (Chuen-Chau, 1997, 64; Leipziger, 1997). Moreover, as with many other Western economic theories, Rostow makes many assumptions about conditions in non-Western countries.

That is, he places all undeveloped countries in the same context. However, Western countries, for the most part, emerged from societies that had hundreds of years of social, political and cultural development (Mason, 1982, 129; Bauer, 1972, 488). ‘These theories of development can thus be criticized as ethnocentric, biased in favour of a particular economic growth pattern, ideologically based on Western assumptions and values; and dogmatic in their insistence upon contiguous progression through historical stages’ (Chilcote, 1984,11). With regard to Rostow stages and the development process for the developed countries, the focus is on industrialization as the catalyst. But time and environments change and to assume stability is to commit the classical longitudinal fallacy.
3. Inability to adopt and/or use new technology

Even if technology that is available via imports to latecomers(such as illustrated in East Asian countries via reverse engineering) creates a distinct advantage for latecomers, developing countries have often not been able to spread technological effects (for example productivity enhancement) to the domestic economy. The emergence of leading sectors does not always mean significant domestic links and nation-wide real income effects.

The absence of solid policies (especially distributive ones) and endogenous growth conditions are some of the reasons why this advantage has been unevenly exploited by developing countries (Mason, 1982, 128). India is an example of this, where growth in some sectors has not meant economic development for the country as a whole or for all groups, all sectors and/or for all regions.

4. Stage Theory Conclusions

There is little doubt that Rostow’s stages of growth model offers insight into the circumstances under which different societies have experienced rapid acceleration in economic development (Bauer, 1972, 489). Moreover, by examining the experience of some countries, such as South Korea, there is little doubt that some of Rostow’s factors can be identified. For example, Korea’s large investment in national income was a critical part of its rapid ascent.

However, in Rostow’s view, South Korea did not meet the ‘maturity’ criteria. Moreover, instead of achieving maturity as incrementally envisioned over a 60-year period established by Rostow, it achieved maturity in less than 15 years (Tovar, 1994, 123). Also, as with other countries that have shown rapid or highly compressed sudden growth, it is difficult to identify the level of uniformity emphasized in Rostow’s formulation (Mason, 1982, 127).

So not only is there the need to recognize the potential for temporal compression in the development process, but also to true leapfrogging due to technology or dynamic returns to the simultaneous integration of multiple factors of production such as technological investments and human capital expansion.
Since Rostow’s book on the stages of economic development, there have been significant changes in the prospects of many countries. Many of those that were mentioned Bristow’s having few of the ‘preconditions to take off ’such as South Korea and Singapore, now satisfy most of the maturity stage criteria.

That many others classified in the take-offstage are ready to achieve ‘self-sustaining maturity’, such as Argentina, calls into question the theory’s reliability (Mason, 1982, 127; Tovar, 1994, 125). The lessons of a historic perspective may or may not be valid in the near-term environment, but not to recognize this would be to accept the principle of uniformitarian’s and to commit the associated fallacy that the past is the guide to the present and future.

2.5 Growth Pole Theory

2.5.1 Introduction

Balanced growth or ‘big push’ advocates have argued that small market economies were victims of a cycle-hindering growth. To break this cycle, countries need to develop a wide range of industries simultaneously if they want to achieve sustained growth. That is, an economy needs a ‘big push’ coordinated by government to allocate resources (Franco, 1999, 17; Perkins et al., 2001, 101). One problem with this view is that it is discouraging advice for a poor country; for example, India in mid-century because it is expected to start up the development process across wide range of industries simultaneously or resign itself to stagnation (Perkins et al., 2001, 101). Hirschman (1958), in a broadening and explication of the work of Perroux (1950), provided a contrary thesis.

He argued that ‘unbalanced growth rather than ‘balanced growth’ was the principal strategy for development (Franco, 1999, 17). He accepted that by 'promoting few nexus segments with solid linkages, then moving onto different segments to adjust the disequilibrium produced by the aforementioned speculations, and so on, was really the right approach' (Krugman, 1994, 42).

2.5.2 Growth Pole Theory: A Review
Hirschman set out his strategy as follows: ‘underdeveloped countries need special “pressure mechanisms” or “pacing devices” to bring forth their potential infrastructure depends less on finding optimal fusions for given assets and variables of creation as on calling for than delisting for infrastructure purposes assets and capabilities that are stowed away, scattered or gravelly utilized’ (Rostow, 1990, 391). Hirschman argued that when ‘one thinks in terms of a missing component, be it capital, entrepreneurship, or technical knowledge, he is likely to believe that the problem could be solved by injecting that component from the outside or by looking for ways and means of producing it within a country’ (Hirschman, 1958, 7, 10).

Instead, he argued, what is needed is a ‘binding agent’ who will bring together the ‘scattered’ or ‘hidden elements’ (factors, resources or abilities) needed for successful development (Hirschman, 1958, 10). With this view, bottlenecks are the main causes of underdevelopment. Thus, policy makers’ attention should be guided to major resource bottlenecks as revealed by the market and ‘induce investment’ or ‘Pressure’ in branches of production that possess substantial backward and forward linkages (Hunt, 1989, 60).

Hirschman argued that the market was the main inducement or policy and, as such, it was an approach that indicated strategy of backward-linked industrialization, starting with import substitution in consumer goods production (Hunt, 1989, 129). Hirschman believed that countries could and did concentrate their energies on a few sectors during the early stages of development’ (Perkins et al., 2001, 102).

A country should specialize in what it could do at least cost and import the rest. All that is needed is to ensure that the domestic industry can compete effectively with imported products. Here the main point is that trade and import substitution are ways ‘to begin industrialization on a limited and selective basis rather than with a balanced big push’ (Perkins et al., 2001, 102).

The major concept in Hirschman’s strategy is that of linkages or what is called ‘spread effects’. An industry creates backward linkages when it uses inputs from other industries which, in turn, allow them to grow at a faster rate (Krugman, 1994, 43). That is: Commercial enterprises are connected to different commercial enterprises in ways
that can and ought to be considered in choosing a growth methodology. Industries with backward linkages use inputs from other industries. Initially, this demand may be supplied by imports, but eventually local entrepreneurs will see that they have a ready market for domestically made machinery. Planners interested in accelerating growth, therefore, will underscore businesses with solid retrograde linkages on the grounds that the aforementioned businesses will fortify preparation in supplemental segments bringing about the creation of compelling multiplier impacts. (Advantage inset al.2001, 102–3) 'Forward linkages happen in commercial enterprises generating merchandise that then end up being inputs into different commercial ventures' (Perkins et al., 2001, 103), 'they include the capacity of an industry to diminish the expenses of potential downstream clients of its features and hence, once more, prod them over the limit of profitability' (Krugman, 1994, 43).

Frome national development perspective this too produces a positive multiplier effect. ‘Both forward and backward linkages set up pressures that lead to the creation of new industries, which in turn create additional pressures, and so on’ (Perkins et al., 2001, 103). These pressure point scan be built (intentionally or unintentionally) by private entrepreneurs seeking new profit opportunities or through government action (Perkins et al., 2001, 103).

As Francois Perroux, the father of growth pol those sectors leading development not only generate strong economic linkages (backward and forward) but also a political economy of their own that supports, protects and guides complementary public infrastructure investments. In Perroux and Hirschman’s view, unbalanced growth was inevitable because budgetary advancement does not seem all over in the meantime and that once it has seemed compelling constrains make for a spatial amassing of financial development around the introductory beginning stages. There could be small question than economy, to lift itself to higher wages levels, must and will first improve inside itself one or numerous provincial centres of monetary quality. This requirement for the rise of 'growing shafts' or 'growth shafts' a term utilized for both territorial and fashion focused on growth] over the span of the growth technique implies that worldwide and interregional bias of development is a certain accompanying and state of development itself. In this way, in the topographical sense, development is vitally uneven.
In Hirschman's view, supporting for the vicinity of lopsided development was sensible in light of the fact that amazing irregular characteristics might be stayed away from through the exact thought of linkages where 'an propel at one focus sets up forces, tensions and impulses in the direction of development at resulting focuses' (Hirschman, 1958, 184).

Consequently, Hirschman proposes that forces energy a nation in the direction of additional adjusted development: 'because of the reliance of the economy in the input–output sense, the extension of one part or sub-segment beyond the other could be depended onto set drives in movement (relative cost updates and open strategies according to protestations about deficiencies) that might almost always kill the beginning imbalance' (Rostow, 1990, 391; Perkins, Radaletetal., 2001, 101). An initial impulse of planning in the form of an investment project will take its own course (that is, invisible hand) with market forces responding to demand and supply (Myrdal, 1968, 1935).

All this, however, is conditioned in Hirschman’s view to the presence of entrepreneurship as it takes innovators like Ford … to establish a new basic industry or to perceive the development potentials of the more backward regions of a developing country' (Hirschman, 1958, 184). Yet, since Hirschman believed that decision-making and entrepreneurial skills in underdeveloped countries were scarce, progressive sectors were easily neglected. ‘Government should therefore concentrate scarce resources in a few sectors rather than in the entire economy’ (Franco, 1999, 17).

Many economists such as Prebisch or Singer were influenced by these ideas. This produced support for an operational import substitution industrialization (ISI) strategy promoted in many countries of Asia and especially in Latin America that admits theoretical justification in the unbalanced growth concepts of supportive sectors with linkages and justifying government intervention to support them as essential for economic development (Hunt, 1989, 61).

2.5.3 Critique of Growth Pole Theory

Hirschman (like Rostow) concentrates on physical investments and outputs, which he assumes to be the vehicles for development, where supplies come relatively
easy and the lack of decision-making risks can be overcome. Again, like Schumpeter and Rostow, he placed great value on entrepreneurship.

While the lack of entrepreneurship is certainly serious obstacle for development, it is also the case that many undeveloped countries have serious supply and institutional limitations, which cannot be overcome by entrepreneurial efforts alone. Moreover, in these countries decision-making is also constrained by the political and economic climate of the country (Bauer, 1972, 480).

In Hirschman’s view, intersectional unbalanced growth seems to be easy to overcome; however, in many countries, such as India, unbalanced growth also has economic and political expression between regions and different ethnic groups. Such differences and their regional manifestation, though embedded in a sartorial structure are pervasive and difficult to overcome. The lack of spill overs from successful regions to those not so successful has created great inequality, and growth in only some regions has constrained more broad-based development (Syrquin, 1988, 211).

Regional economist, regional scientists and economic geographers have long understood that’s economic activities grow and concentrate at a location, the relative importance of that location grows. In turn, as more activity is concentrated at a location, the location becomes more attractive also because of the many activities that are occurring there. In short, economic benefits derive from agglomeration.

This is the assumption upon which much of growth pole theory is erected and the vigorous interest that has emerged in industrial clusters as a primary focus of local and regional as well as national growth policy (Porter, 1990). Agglomeration or agglomerative forces are viewed as arising from one of two sources.

The Jane Jacobs (1969, 1984) school argues that the attraction arises from the spill over effects of multiple and diverse activities that make up the urban milieu. Such attraction arises from so-called urban economies as it derives from the diversity of activities in the urban context. However, another tradition that began with Marshall (1920), later amplified by Arrow (1962), and even later rediscovered by Romer (1986) and others such as Porter (1990) argues that interdependent industries are attracted to each other and thus create what are called ‘location economies.
2.6 The Export-Oriented Industrialization (EOI) Strategy

2.6.1 Introduction and Description of EOI

From the 1930s to the mid-1970s, the growth strategy known as ISI dominated economic planning and policy in Latin America and Asia. ISI was a deliberate effort by structuralists to free developing countries from their dependence on developed countries. This strategy required that governments play an active role in the economy.

The main tools used in this strategy were import licensing, tariffs, overvalued exchange rates and direct government investment in key industries (Cardoso and Helwege, 2000). A main short coming of this strategy was ‘its failure to stimulate the maintained benefit development that is the sign of the long run financial infrastructure in the most propelled economies' (Stern, 2001:53).

In Indias started in the Nehru years (1947–64) as a reflection of Gandhian principles and it was reinforced under Prime Minister Indira Gandhi the mid-1960s and 1970s. However, a large fiscal deficit (8.4 pc of GDP) in 1985 and the exhaustion of foreign reserves by 1991 forced the government of Rao to adopt reform, whereby liberalization and market-oriented strategies were put in place (World Development Report, 1997).

After the failure of ISI and the related Keynesian welfare state theory in many countries of Latin America and Asia, along with a growing consensus about the benefits of liberalization, most of these countries engaged in market-oriented strategies. By the mid-1980s and early 1990s most Latin American and Asian countries followed policies promoted by IMFs that were based on a new school of thought known as ‘export-oriented industrialization’ (EOI). The main proponents of EOI among others were Krueger et al. (1985), Balassa (1981) and Bhagwati (1985).

EOI is based on the idea that the integration of a country into the world market through export trade will encourage economic growth and development (Dussel, 2000, 13; Dussel, 2001, 124).

The above is consider denuder the assumption that trade turned generation of assembling boosts the productive allotment of variables of handling and specialization
near countries consistent with their individual relative cost preferences and that this would stimulate competitiveness. Thus, successful EOI ensures that goods and services are produced where it is cheapest to do so: price is seen as the fundamental ‘signal’ (Dussel, 2000, 12, 16).

2.6.2 The EOI Argument

The main arguments for the implementation of EOI lie in its capacity to create spill over’s. That is, exports create a dynamic effect on overall economic growth. According to EOI trade allows countries to allocate resources more efficiently (according to their comparative advantage), have access to foreign capital (for example, foreign direct investment (FDI)), and enables the learning of new techniques and processes. Furthermore, it increases familiarity and access to new production technologies and new goods invented abroad (Dussel, 2000, 14).

As a result, a country that seeks an outward orientation should be able to benefit from technological spill over’s generated by trade and better participate in the international flow of goods and technologies (Keller, 1996, 200).

For many countries, the promotion of EOI was seen as a way for ‘catalysing end igneous industrial development’ suggesting concrete linkages, higher foreign currency, jobs, upgrade personnel and a genuine transfer of technology (Wilson, 1992, 40; Sklair, 1993, 196). However, in many cases, EOI as not successfully created end igneous industrial development (Wilson, 1992, 7).

Several schools of thought such as nanostructure lists (Taylor 1988) new neoclassical theories (Krugman, 1994) and new growth theory (Pack, 1994; Romer, 1994) have rejected the assumption of EOI that market-oriented strategies are sufficient for economic development. Growth or development ‘is significantly correlated (or explained) by factors other than capital and labour, such as human capital conditions’ (Dussel, 2000, 20). Under new growth theory, the production function (based on capital and labour) is expanded to include research and development, technological advances, physical capital (infrastructure) and human capital or education.
These variables are seen as central indicators of ‘endogenous growth conditions’, and are expected to generate spill over’s and externalities, including economies of scale (Malecki, 1997; Cimoli 2000). For this school, the ‘East Asian miracle’ is seen largely as a result of increases in labour skills (through education) and capital investment (Krugman, 1994; Malecki, 1997; Nelson and Pack, 1999).

Further, a great number of studies conducted in the USA, Japan and the UK have found that increases in output are not attributable to capital investments but mainly to improvements in human capital including the quality of labour, education and training, and experience. Capital investment growth accounts for less than half of all such growth (Malecki, 1997, 38).

Also, Romer(1990) shows that growth and growth differentials between nations are the result of using and producing ideas and knowledge, and that such variables should be considered in the production function in order to achieve sustainable growth.

The different experience in the newly industrialized countries(NICs) compared to many other countries, such as India with the EOI strategy, shows that it requires the presence of endogenous growth conditions in order to be successful. The EOI strategy has been almost homogeneously beneficial in terms of its capacity to increase the volume of exports.

However, when a country lacks endogenous growth conditions such a strategy cannot be successful because the export sector draws its dynamism from abroad rather than from the local national Economy.

Endogenous growth conditions have been recognized to be essential for a successful integration into the world economy. The lack of these conditions could (and usually will) impede the ability of the domestic sector of a given country to respond fast and to upgrade its production in ways that reflect the new needs of the global economy (Cimoli, 2000; Dussel, 2000).
2.7 Some Development Issues in India

Since India’s trade policy reform in the 1990s, it has experienced positive growth results. For example, India’s average annual rate of real per capita income growth increased from about 1 per cent in the 1960s and 1970s to about 3 per cent in the 1990s (Stern, 2001, 54, 2002, 3, 11).

Also, trade liberalization ‘has brought about gainfulness grows connected with expanded rivalry, improvement and securing of new learning and advances, all of which have committed to bringing living norms up in the country’ (Stern, 2002, 10). In short, India economic development performance suggests improvement has been achieved.

However, many have questioned how much India’s recent economic growth has been pro-poor. Data shows that the decline of poverty since the beginning of the reform period has been at least 1 per cent per year (Stern, 2001, 54, 2002, 3, 11). However, such reduction has only occurred in some states.

Considerable differences in sectors and geographical balances of growth explain why India’s economic growth has not made a greater impact on the poor (Gaurav and Ravallion, 2002, 1). ‘Initial conditions mattered. States that began the period with better base and human capital infrastructure – with additional serious watering system, more stupendous education, and lower tot death rates – had fundamentally more stupendous lifelong rates of utilization development hand neediness reduction’ (Gaurav and Ravallion, 1996, 1).

Those states that lacked such conditions have generally been bypassed by India’s economic growth. Moreover, it is argued that the slowdown of the reforms in the past few years, rigid labour policies and the presence of subsidies and barriers to domestic entry have not only slowed the pace of growth and poverty reduction but they have also reduced India’s possibilities for greater insertion into the international market (Stern, 2002, 15, 46).

In otherworld’s, economic growth does not necessarily mean economic development and better conditions for a country as a whole. In India, as in Mexico and other developing countries like the Philippines, the economic growth generated by EOI has concentrated in some regions and when initial conditions are missing great
inequalities are created. Evidence shows that the EOI strategy by itself is not a sufficient condition for achieving sustainable economic growth.

2.8 Development through knowledge

Micro studies on development and technology transfer to emerging economies suggest that cross-national differences in productivity and performance may be influenced by national systems, institutions, and policies that affect the innovative capabilities and aspirations of firms (Nelson, 1993; Dahlman et al., 1987; Enos and Park, 1988). However, while economists remain interested in cross-national differences at the industry level, the role of the firm in building capabilities is underemphasized. Hence, the processes that shape the development of national capabilities and facilitate innovation are not well understood.

This chapter aims to address this lack by developing a framework for capability creation and diffusion in emerging economies such as India, which links firms with industries, the institutional environment, and with global markets.

In the absence of well-developed indigenous markets and the latest developments in manufacturing technologies, firms in emerging economies seek external markets and alternative sources of new technology. This fact is well documented in research on the development of the newly industrialized countries (NICs) and also evidenced by the diffusion of manufacturing technology from the UK to the USA in the early days of industrialization (Licht, 1995).

We focus on how cross-border interactions with multinational firms catalyse local learning, adaptation, and innovation; and by inducing competition in the domestic environment, increase specialization, and align domestic firms with the global economy in an evolving international division of labour. Evidence from case studies in the software industry suggests that capability building and learning through knowledge creation is a feasible development strategy for emerging economies with institutional structures that support knowledge-based industries.

We suggest that the window of opportunity offered by the low-cost advantage and ‘global’ identity enjoyed by Indian software firms in international market scan be
leveraged to higher-value activities to maintain a position of pre-eminence in knowledge-intensive industries.

The chapter is organized as follows: the first section outlines prior research drawing on theories of learning, knowledge transfer, and diffusion relevant for national performance and development. The second section presents a theoretical framework of knowledge creation, replication, and capability building in firms as social communities linking micro-level learning, problem-solving and innovation to evolution at the industry and national levels.

In section three, we document the evolution of Indian participation in knowledge creation via a case study of micro-level learning and innovation in an Indian software firm and its evolution as a participant in local and international markets. In the final section we discuss the implications of this framework for the development of the Indian economy, and for emerging economies in general.

2.8.1 Technology, Learning, & Dynamic Capabilities

Theories of development have evolved from the idea that development proceeds in linear stages (Rostow, 1960) to the understanding that structural changes are required for development (Chenery, 1979), followed by political approaches that focus on the dominance–dependence relationship between developed (the centre) and developing countries (the periphery), rendering attempts by poor nations to be self-reliant and independent difficult, if not impossible (Baran, 1975; Griffin and Gurley, 1985). In the 1980s and early 1990s, the neoclassical revolution attributed development failures to excessive government intervention and regulation. (Lal, 1985; Little, 1982; Tovar, 1994). Studies of NICs (Krueger, 1995; Wei, 1995) find support for the position that less government intervention as evidenced by the adoption of liberalization policies in these countries is positively associated with development. However, government intervention may be necessary to facilitate the operations of markets by investing in physical and social infrastructure, healthcare, and educational facilities, and by providing suitable climate for private enterprise (Stiglitz, 1998). While theories of endogenous growth recognize problems of (Tovar, 1994), the focus on the behaviour of the economy as a whole (Romer, 1994) has led to a relative neglect of the impact of human capital formation and knowledge creation at the firm Level.
Moreover, how the development of national systems of science and technology shape institutions that influence participation in knowledge creation must be examined (Nelson, 1996; Cantwell, 1989).

While the rate of technological advance is a central factor associated with cross-national differences in performance, macro studies repress the fact that significant inter-industry differences exist and that research and development (R&D) spending is an important variable in cross-industry analysis (Nelson, 1996).

In addition, while dissimilar factor prices can explain international intra-industry differences in productivity and differences in vintage may account for intra-national differences, insufficient attention has been given to differences in internal organization and managerial coordination (Nelson, 1996, p. 25), although these are tacitly acknowledged in studies by Lall (1987), Enos and Park (1988), Dahlman et al. (1987), Bell and Scott-Kemmis (1988). Studies viewing firms as social systems (Marchland Simon, 1958; Weber, 1947; Perrow, 1979) suggest that the processes by which technologies are selected, and decisions translated into action are far from stable.

Thus, the micro processes and mechanisms by which capabilities are built in firms and industries are inadequately emphasized. The understanding that knowledge underlies technology and is a strategic and competitive resource (Winter, 1987; Winter and Szulanski, 2001; Nonaka, 1994) raises the question of how to determine where knowledge is located and how to transfer and replicate it. A general conclusion derived from various taxonomies of knowledge is that codified knowledge is easier to transfer knowledge, which is often specific to the context in which it is developed (Winter, 1987; Kogut and Zander, 1993).

Hence, while knowledge and capabilities diffuse within countries, cross-border transfers may be difficult (Kogut, 1991). Although the increased use of general and abstract knowledge is argued to make knowledge less context-dependent (Aurorae al., 1999), this conclusion overlooks the importance of practice and participation in communities and the role of institutions in shaping the context of transfer.

Finally, these studies do not focus on the mechanisms of knowledge creation and capability building or on inter-industry variations in capabilities and performance.
2.8.2 Knowledge Creation & Innovation In Global Communities

We use an evolutionary approach to develop our framework of knowledge creation and capability development. The central task in knowledge creation is the transfer and recombination of tacit and explicit knowledge (Nonaka, 1994) via a craft or industrial system. We focus on knowledge creation via a ‘modular assembly’ or mass-production system.

In the ‘modular assembly’ system, a key mechanisms codification, which involves externalizing memory. Codification depends on complex actions such as, to detach knowledge from the individual and render memory and communication capacity independent of human beings.

Thus, codification reduces knowledge to information, enabling its reproduction which is almost instantaneous when the learning task is simple. In complex cases, knowledge reproduction occurs through training, practice, and simulation techniques because codification only provides partial assistance (David and Foray, 2002).

Codification thus creates new cognitive potentialities by translating knowledge into symbolic representations. Engraving through composing, illustrations, and so on makes it conceivable to inspect and mastermind learning in diverse routes and to seclude, group, and join diverse segments, result in gin new knowledge objects such as lists, tables, formulae, and theories.

Knowledge arises from a response to a problem; trials, experiments, and solutions to the original problem lead to new problems and theories. Advances in information technology-based recording methods and codification facilitate memorization, communication and learning, and the creation of new knowledge objects (David and Foray, 2002).

Information technologies enhance creative interaction not only among scholars and scientists but, equally among product designers, suppliers, and customers. Virtual objects can be modified infinitium, are instantly accessible to all, and serve to facilitate
learning. Communities of practice that promote participation and reification (the creation of knowledge objects) are essential for knowledge production (Wenger, 1998).

Participation involves renegotiating meaning and creating density while reification aids problem-solving by externalizing the mental process through the production of artefacts. Innovation and the creation of new products are, thus, a natural consequence of learning and problem-solving within communities.

At a collective level, practice enables the community to reconceive its environment and identity. Innovation and new interpretations emerge from practice and from interactions with other communities that help align competence and identity with other trajectories, thus linking the local with the global. Establishing effective communities is, therefore, a central task in knowledge creation.

Communities are important because tacit elements remain even when knowledge has been codified, necessitating interactions via artefacts. Evidence from research on social capital suggests that communities provide identity and access to resources and knowledge (Coleman, 1988).

However, the knowledge production system is becoming more widely distributed across a host of new actors and places (Nelson, 1996; David and Foray, 2002; von Hippel, 1988), a consequence of the rising speed and intensity of innovation as evidenced by the volume and approved (OECD, 2002), by the proliferation of new goods and services in the movement towards ‘mass customization’ (David, 2000), and by the need to innovate for survival in an increasingly competitive and global world (Nelson, 1993; Clark and Fujimoto, 1991). Thus, a key challenge in developing new technologies and innovating, both of which are important for development, is facilitating the creation of knowledge communities across organizational and national boundaries.

2.8.3 Facilitating Knowledge Production via Cross-Border Interactions

Facilitating knowledge production in global communities involves:

(1) Fostering relationships and interactions with external communities to ease information sharing and ensuring benchmarking and access to expertise;
(2) Architecting organizational designs to ease coordination and elaborative knowledge production; and

(3) Enabling practice, participation, and experimentation to aid problem-solving.

Firms in emerging economies access new knowledge primarily in two ways. First, interactions with buyers in industrialized countries provide information about product specifications and requirements (Enos, 1991; Westphalia et al., 1985). Second, domestic firms’ interactions with foreign suppliers via technical collaborations, joint ventures, and subsidiaries provide knowledge embodied in documents, machinery, marketing, and manufacturing expertise. In this chapter we focus on the first type of interaction.

In both the above cases, promoting trust is critical to ease the coordination and communication of both tacit and codified knowledge to speed innovation. Trust is widely recognized as contributing to cooperation, information exchange, and enhanced system efficiency (Arrow, 1974; Coleman, 1988). Lack of communication, collaboration, and involvement in the supply of training, access to knowledge critical for product development, and the provision of appropriate role modelling.

In addition, to adapt products for the foreign market successfully, suppliers from developing countries require access to knowledge about the new institutional context. Moreover, a social community is required for the evolution of a common language to speed the flow of information (Arrow, 1974) and induce the adoption of new benchmarks and aspirations. Second, collaborative knowledge production is speeded by using an organizational design that facilitates concurrent rather than sequential information processing to promote the rapid diffusion of knowledge. This requires effective boundary spanning across internal departments and involving actors in the larger community (such as local suppliers).

Organization design is a critical challenge because while specialization increases efficiency (Lawrence and Lorsch, 1969; Thompson, 1967), it impedes knowledge sharing since it fosters different cognitive and emotional orientations (Lawrence and Lorsch, 1969).
Modularity, a strategy for designing complex technical systems and processes efficiently, is a design rule facilitating concurrent information processing (Baldwin and Clark, 2000). Modular systems are composed of independently designed units but functions an integrated whole. Modularity offers design advantages because experimentation and improvement of components can occur within a module without compromising the efficacy of other components and without requiring change in the system’s overall architecture.

Modularity provides a way to divide the labour and knowledge of the overall system so that individuals responsible for the system, components, and sub-systems can experiment and make improvements independently. Analogously, organizational structures that encourage interactions between different communities of practice, yet permit modularity, enable speedier problem-solving. The use of geographically dispersed teams is facilitated by the adoption of modular design principles in organization, since each unit is independent.

Third, practice is critical to the development of expertise and knowledge production in firms. When foreign collaborations interacting ways that prevent participation and practice, knowledge acquisitions aborted in local firms (Lave and Wenger, 1991). Inability to experiment, organ access to the requisite methodologies can make knowledge production costly, difficult, and slowing domestic firms.

However, participation in collaborative work diffuses commonly employed concepts and terminological conventions. The software development process has historically been seen as an art to be performed by those with advanced technical training. Over time, however, the application of industrial engineering concepts helped to systematize and standardize the process.

Thus, the evolution of the software industry can be viewed as a movement from a craft-based to a modular system of knowledge production and organization.
2.8.4 Indian Participation in Knowledge Creation

Liberalization of the economy in the wake of India's budgetary emergency in 1991 accelerated the relinquishment of post-freedom monetary approaches of import substitution and toddler industry security in favour of arrangements concentrated on fares and diminishing obstructions to entrance to outside firms (Jalan, 1991). Rivalry from multinationals advanced household firms to look for a result for the issue of how to contend all around and take an interest in planet advertises.

Cross-outskirt connections in the connection of supplying innovation identified administrations to remote firms can consequently be seen as trials in studying arranged inside an ecological setting of move from a shut to an open economy. Hence, the focus in this chapter is on interactions with global buyers of software services from India. We examine the evolution of the software industry, and document the development of cross-border communities of practice enabling knowledge creation in a leading software firm. Studying leading firms is important (Teubal, 2003) for encouraging development; particularly since they serve as role models for stimulate inactivity (Arora and Athreye, 2002).

2.8.5 The Evolution of the Software Industry

The early days of computing were dominated by public research organizations and the early history of software was linked with the development of the Indian hardware industry (Heeks, 1996). ESSO Standard, the Indian subsidiary of Exxon, installed the first commercial computer in 1961. Thereafter, computers were imported from international suppliers such as IBM, Digital Equipment Corporation, Burroughs, Sperry, and Honeywell.

During the 1970s, government and academic computer users relied on imported software bundled with the hardware and also internal software developers. With the increasing use of computers, a domestic market for software emerged as development began to be contracted to outside organizations such as management consultancies.

The departure of IBM and other foreign manufacturers in the 1970s prompted the growth of Indian firms to fill the void to offer local companies assistance in importing computers, software development, and low-level data-processing functions,
in addition to helping them gain skills in working with UNIX (the first portable, machine-independent, multi-user operating system), the system of choice for personal computers (PCs) and workstations in the 1990s (Saxenian, 2000).

As their capabilities grew, the software firms began to look offshore, hoping to leverage their relatively lower labour costs of skilled software programmers.

Advances in infrastructure development, a large English-speaking and low-cost scientific manpower reservoir, and a well-functioning technical education system graduating more than 60,000 technically trained workers each year, catalysed the emergence of the software industry and a new industrial location, India (see Table 7.2 for productivity measures of selected Indianan US software companies).

The Indian information technology (IT) and IT-enabled services industry has grown at a compound annual growth rate (CAGR) of 46 per cent in the last four years. Export revenues of India’s software services market reached $6.2 billion last year, up from under $500 million in the mid-1990s (Economist, 2003).

IT services exports are estimated to grow to $28–30 billion, while IT-enabled services exports are projected to grow to $21–24 billion accounting for more than 30 per cent of foreign exchange inflows in 2008 and a major driver of economic growth (NASSCOM, 2002). Also, 80 per cent of all Software Engineering Institute Capability Maturity Model (SEI–CMM) level 5 firms are in India.

Wipro InfoTech, one of the leading software companies was established in 1980 and made its entry into the IT area by manufacturing minicomputers to take advantage of confinements on imports of minicomputers, accordingly improving solid aptitudes in equipment plan. The association dropped in the programming business in 1989, however could not improve item programming and reoriented its procedure towards programming administrations through the formation of a seaward advancement drop in. Later, it started to offer mixed software/hardware benefits. While there has been some item improvement movement, it is restricted. Wipro's deals in 1998 were $350 million of which $100 million were equipment bargains.
The following stage for Wipro might include going up the worth chain, through participating in settled value transactions for requisition programming growth, specialization in vertical fragments like fund and retail, and the infrastructure of some reusable programming segments which might stand for constructing squares for hefty programming ventures of customers abroad.

2.9 Infosys Technologies: A Case Study

Using our framework of knowledge creation through communities facilitating cross-border interactions, we examine the growth and internationalization of Infosys, a leading software company established by Narayana Murthy in 1981 and based in Bangalore. From its inception, the company focused on the US market given its size and the differential in labour costs of US and Indian software professionals. Growth in the 1980s was slow with only one major US customer until 1986 when Infosys entered a short-lived joint venture with Kurt Salmon Associates to deliver software services. In addition Indian government regulations on setting up foreign offices and restrictions on the entry of Indian programmers into the USA hampered efforts to sell in the USA (Mandan Delong, 2002).

The program of economic reform initiated the government in 1991 also intensified competition as multinational companies like IBM began to consider re-entering India to set up development enters.

Despite dire predictions that Indian firms would be unable to compete in the war for skilled talent, Infosys adopted practices such as offering employees stock options in line with the compensation packages of multinational companies and improved the work environment: two major reasons for the defection of potential employees to MNCs.

Indian programming firms likewise started moving from form shopping contracts to seaward improvement contracts (ODCs) – Indian programmers composing programming in India for outside associations. ODCs offered more stupendous arbitrage chances than form shopping (the normal pay for a programming expert in
India was about $13,000/year contrasted with $75,000/year for an Indian programmer in the USA). While ODCs brought down the on the whole expenses of advancement and furnished a 24-hour work cycle, they encroached a more terrific hazard on customers. In form shopping, the customer regulated the parameters of the tasks and nearly followed the programming infrastructure handle.

Associations like Infosys had added on some learning of customer necessities in the USA through the form shopping alternative. In the early 1990s it was one of the heading programming associations to follow ODCs' chances. ODCs needed the programming suppliers to control and screen programming growth in the interest of the customers and take charge of knowledge production. To reassure customers, Infosys focused on institutionalizing quality and received ISO9000 certification, thus further raising quality awareness in the firm (Arora and Asundi, 1999, study ISO certification in Indian software firms and find that ISO certification both enhances quality and has a positive impact on firm growth).

Rapid expansion led to the diversification of the client base which consisted mainly of US clients and geographic locations to gain access to other locations that were rich in engineering and technical colleges. In 1998, Infosys became the first Indian company to receive level 4 certification of the SEI-CMM and was on track to receive level 5 certification in 2000, joining the ranks of the 2 per cent of companies worldwide to achieve level 4 or higher certification. Infosys also began to take on an increasing share of the risk involved with software development by offering clients ‘managed software solutions’ – fixed time, fixed price projects with quality guarantees.

In addition, mission-critical software systems were also being developed for clients like Nortel, Reebok, and Nordstrom. For example, beginning in 1992 with simple tool development for Bell Northern Research, a R&D division of Northern Telecom (as Nortel was then called) generating $200,000 in revenues, Infosys’ relationship with Nortel developed into an intense collaboration with core R&D engineering groups and even working with Nortel clients generating $8 million in revenues (Mandan Delong, 2002). By 1999, Infosys had 114 customers and most of its work focused on writing customized software for installation at client sites. The use of dispersed teams using a modular structure was adopted.
To begin with a common undertaking needed minor crew of activity guides to head out to their customer's area to learn the customer's necessities and details. Second, the undertaking pioneers might come back to India and manage a crew.

A little gathering of individuals generally stayed on location with the customer, collaborating with the home base by means of satellite-empowered correspondences on issues for example evolving determinations, getting lucidity on issues, getting consent for progressions, and so on.

Once the activity was finished, a group might head out to the customer's site to institute the programming, test it, and train the customer's staff (Nanda and Delong, 2002).

Infosys established a global identity by using global development centres (GDCs) located in globally optimal destinations in India and abroad, including work at both ODCs and proximity development centres (PDCs) or teams of Infosys employees located close to the customers. Management expected that the GDC model would ‘help change the image of Infosys from purely an off-shore development company to an all-purpose global IT based problem solver’.

In its quest to globalize, Infosys tapped the markets in the USA in March 1999, with a $75 million issue of 1.8million American Depository

However, an emerging international division of labour between India and the USA in software was apparent, with low-end work programming work done by Infosys in the early stages and the high-end design work being done in the USA However, this division of labour is not static.

By the late 1990s, India began to be seen as a global leader in software development, with the trend towards outsourcing projects accelerating and more value-added work being sought by Indian firms like Infosys.

However, while in terms of revenue and export performance, the Indian software industry is comparable to Ireland’s and Israel’s and larger than that of South Korea, earnings of professionals are well below those in Ireland and Israel (OECD, 2010) and its share of world markets remains small. Since 2009, the IT-enabled services
sector has blossomed with firms in India engaged in providing business process outsourcing services to US clients. While the major proportion of the work relates to back-office processing, customer service, and claims processing, there is also a trend towards outsourcing higher-end and time-critical projects such as real estate and financial analysis, market research, and design work (NASSCOM, 2010, pp. 19–29; see Table for the projected growth of IT-enabled services).

Multinational corporations (MNCs) have been quick to take advantage of India’s competitive environment, by establishing a base to develop and deliver high-quality software applications.

2.10 MNC Employee Record Overview:

<table>
<thead>
<tr>
<th>MNC</th>
<th>Employees (as of 31 March, 2009)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. IBM Global Services</td>
<td>3,100</td>
</tr>
<tr>
<td>2. Cognizant Technology Solutions</td>
<td>2,712</td>
</tr>
<tr>
<td>3. Oracle India Pvt. Ltd.</td>
<td>2,000</td>
</tr>
<tr>
<td>4. Covansys (India) Private Ltd.</td>
<td>1,595</td>
</tr>
<tr>
<td>5. Syntel</td>
<td>1,580</td>
</tr>
<tr>
<td>6. Hughes Software Systems Ltd.</td>
<td>1,500</td>
</tr>
<tr>
<td>7. Hewlett-Packard Software Operations Ltd.</td>
<td>1,489</td>
</tr>
<tr>
<td>8. Digital Globalsoft</td>
<td>1,480</td>
</tr>
<tr>
<td>9. PwC</td>
<td>1,200</td>
</tr>
<tr>
<td>10. OrbiTech Solutions</td>
<td>1,191</td>
</tr>
<tr>
<td>11. Siemens Information Systems Ltd.</td>
<td>1,187</td>
</tr>
<tr>
<td>12. Xansa (India) Ltd.</td>
<td>892</td>
</tr>
<tr>
<td>13. Motorola</td>
<td>800</td>
</tr>
</tbody>
</table>
This chapter also intended to review the previous literature related to this research including relevant case studies. This 'secondary analysis' can be defined as the analysis of data collected by another researcher or organization (Gurbaxani & Mandelson 1991).

The knowledge acquired from secondary data can help in refining the focus and formulating the hypotheses and theoretical frameworks of a piece of research (Gurbaxani & Mandelson 1991). Specifically, in this case, the aim of the review of the literature is to identify variables that may affect ICT implementation and, in particular, those that relate to e-administration. Literature that concerns developing countries is sparse but particularly important.


The chapter starts with a review of the planning, implementation and management techniques used for ICT projects. Planning, whether for a research project, journey, writing a book or implementing an ICT project is considered a necessary first step.
Planning allows a project to be evaluated at the feasibility study phase. This chapter also explores literature on ICT success and failure in general, in developed and developing countries and then specifically for Nation. The chapter identifies factors and show how their presence or absence affects ICT implementation in government.

The driving forces and barriers to implementation are analysed and synthesized. Some of the models discussed in this research are business oriented. However, as observed by Ndou (2004), the public sector has recognized the potential importance of ICT and e-business models as a means of improving the quality and responsiveness of the services they provide to their citizens.

2.11 ICT Project Planning and Implementation

In government, just like in other organizations, it is necessary to manage projects. According to Burch (1992, p. 78), "project management employs four functions namely: planning, organizing, controlling and leading". Accordingly, planning involves stating what should be done, and estimating how long it will take and what it will cost.

Organizing involves staffing the project team, bringing together users, managers and systems' project team members to focus on the planned systems project. Controlling involves monitoring progress reports and documented deliverables and comparing plans with what actually occurred. Leading involves adapting to the dynamics of the enterprise, dealing with setbacks, and guiding and inducing people to perform at their maximum abilities.

Marble (2003), quoting Swanson (1988), restricts implementation to the systems life cycle stages between design and use. In this regard, Swanson defines implementation as "a decision-making activity that converts design into an operating reality so as to provide value to the client".

Further, Marble (2003) observes that project management refers to the way the implementation is conducted, including its organization, scheduling, and responsiveness to its stakeholders. According to Earl (2003), literature recommends
that Strategic Information Systems Planning (SISP) targets the following areas:
aligning investment in IS with business goals exploiting it for competitive advantage;

- "Directing efficient and effective management of IS resources
- "Developing technology policies and architectures

Though the above recommendations are meant for ICT planning in business, they are very relevant in planning e-government projects. Burke (2003) identifies four phases of a project cycle listed below.

1. Concept and initiation phase: starts with the establishment of a need or opportunity for the product, facility or service.

2. Design and development: uses guidelines set by the feasibility study to design the product, outline the build-method and develop detailed schedules and plans for making or implementing the product.

3. Implementation or construction phase: implements the project as per the baseline plan developed in the previous phase.

4. Commissioning and handover phase: confirms the project has been implemented or built to the design and then terminates the project.

The above steps can be used to establish the 'e-readiness for the government during the feasibility phase. They also lead to identification of some of the factors for success or failure if the planning aspect is not right as observed later in this chapter. A familiar maxim says, 'if you cannot plan it, you cannot do it'.

Another maxim says, 'I never planned to fail, I just failed to plan'. Planning spans the whole project period from feasibility studies to implementation and testing of the product. It begins once the project planning activities determine the organization's strategy and identifies the ICT projects.

Planning of ICT systems has been advocated in the past with Kupfer et al. (1976, p. 7) observing that a "planning process is not confined to making a set of pro and con
decisions about computerization; the investigation that surrounds the planning of any successful MIS (Management Information System) has to be so pervasive that it involves virtually every aspect of the organization.

Within the framework of a few fixed constraints, project plans evolve with the lifecycle (Maciaszek 2005). These constraints are time and money so each project has a clear deadline and a tight budget.

One of the first tasks in project planning is to assess whether the project is feasible within the time, budget and other constraints.

If it is feasible, the constraints are documented and can only be changed in the course of a formal approval process. According to Moran (1998), a planning process effectively has to respond to internal and external forces (drivers) that can have strategic significance on the organization’s future. Moran observes, 'To build a strategic ICT plan that is aligned with both the organization’s strategy and the practical reality of the organization, a planning process is required' (Moran 1998, p. 44) which led to the development of the strategic alignment framework. Adding to this, Wunderle (1998) observes that implementation planning requires greater detail and more thorough analysis when people, money, time and other resources must be committed to the project.

According to Beynon-Davies (2002), informatics planning is the process of planning the transformation of one ‘informatics architecture into another. Beynon-Davies identifies three major forms of analysis that have input into the planning process: organizational analysis that involves an analysis of the current organizational activities and plans to change to such activities, an environmental analysis that concerns the current and future trends in the immediate environment; a technology analysis that concerns trends in the information technology that are likely to impact upon the organization.

Further, the objective of informatics planning is to develop an informatics strategy, which is the structure within which information, information systems, and information technology is applied in organizations. The strategy aims to avoid fragmentation, redundancy and inconsistency amongst information systems in the
organization. As observed by Knott & Dawson (1999), the main identifying criteria for a project is that

A project is a planned activity which is not part of our working routine and that has either specific objectives to be met or a specific product to be produced. With a lack of ICT policies as guidelines, the specific objectives may not be clear and this might have impact on successful delivery of the product. In addition, the constraints may not be adequately identified and the optimum use of the resources may not be achieved depending on the nature of the project.

According to Moran (1998), in planning, projects are identified, classified, ranked and selected for initial development, for improvement, or perhaps for elimination. The question is how can we successfully implement ICT projects? The decision as to which way to go can be based on business strategy and on methodical planning.

The inability to realize value from the ICT investments is, in part, due to the lack of alignment between organizational and ICT strategies of the organizations concerned. According to Moran (1998), studies by Henderson and the IBM consulting group (Henderson et al. 1992, 1993, and 1994) revealed that many strategic planning efforts failed due to a misalignment between the focus of the ICT plan with the strategic and tactical needs of the organization which are driven by the organizational vision. According to Moran (1998, p. 39), "plans fall into one of the two categories: vision without substance and a budget without vision ".

The identified problems of vision without substance are vagueness of future vision, lack of institutional vision, current position and time. Identified issues of budget without vision are questions as to what problem is being solved, what are the priorities and definition of the roles and responsibilities. Various planning models and methods for ICT implementation have been suggested (Maciaszek 2005).

A traditional approach suggested by Maciaszek named SWOT - strengths, weaknesses, opportunities, and threats, allows the identification, classification, ranking and selection of IS development projects in a manner that is aligned with an organization's strengths, weaknesses, opportunities, and threats.
In this approach, the mission statement is assumed to capture the unique character of an organization and specifies its vision of where it wants to be in the future. A SWOT analysis can also be done to determine the best way forward in implementation when confronted with several challenges.

Maciaszek (2005) points out that all planning approaches have an important common denominator: they are concerned with effectiveness (doing the right thing) rather than efficiency (doing things right). The implication of this to ICT implementation in government is that, planning as a tool can help in reducing waste by identifying the pre-requisite conditions for successful ICT implementation rather than rushing into a complex e-government strategy without having first finalized a national ICT policy.

Wixom and Watson (2001) observe that there is no generic model of ICT implementation because different ICT implementations possess unique qualities that alter the importance or effects of implementation factors. They observe that this is true for ICT projects, as ICT is an enabler rather than an application per se. However, there are similarities with other applications as regards project teams, technologies, methodologies and working with the user to gather requirements. Other approaches like the System Development Life cycle and Structured System Analysis and Design Methodology are well established.

However, they tend to focus on design and development and do not address the wider organizational and infrastructure issues. Knott & Dawson (1999) identify three reasons for poor project planning in organizations. These are: risk management had not been addressed, business systems had not been fully justified, and a lack of involvement from management. These can be taken as the major reasons but not exhaustive due to the diversity of the implementation environments.

Also, as noted by Bannister & Remenyi (2000, p. 1), "when it comes to complex decisions, managers often rely on methods which do not fall within the traditional boundaries of so-called rational decision making". Bannister & Remenyi (2000) observe that managers sometimes base decisions on 'acts of faith, gut instinct or blind faith' (referred to as strategic insight). Harindranath (1993) notes that, though
developing countries commit a sizable amount of economic resources to ICT, for them to reap maximum benefits, ICT needs careful planning and coordination prior to implementation and use.

This view is supported by Kaul & Odedra (1991) in their recommendations namely, redefinition of the roles of the coordinating bodies, formulating coherent policies and strategic planning to determine priority areas. In the absence of these, the trial and error methods of implementation that seem to characterized most government ICT applications can only result in the wastage of scarce resources. Among developed countries, the UK government has widely adopted the use of PRINCE 1 and PRINCE 2 methodologies for ICT planning (De Chazal, 2002). PRINCE 2 which is a process-based reject management approach allows tailored, flexible and scalable solution for project management. However, De Chazal (2002) observes that success is not guaranteed and is notoriously poor.

Further, Heeks (2002b) argues that sometimes even with sufficient planning, projects can still fail. This is attributed to inappropriate planning methods being used especially in developing countries where planning methods are still borrowed from developed countries. These methods are, for example, the Strategic Information Planning which assumes lack of political interference, which may not be realistic in government.

All the arguments for planning in the reviewed literature show that ICT project implementation is a complex exercise requiring careful planning. This implies that more research is needed to identify challenges, good practice and solutions for successful implementation. While some of the identified challenges, practice and solutions will be generic for all ICT projects it is inevitable that some aspects will vary with the environment in which a project takes place.

The implications for this research project are that general solutions and good practices to common challenges must be sought, but in addition, the challenges, solutions and good practices that are particular to the government environment must also be identified. The literature shows that an emphasis on planning will be necessary
in the production of the guideline document of the second aim and eighth objective of this research.

2.12 ICT and IS success and failure

The literature shows that the planning and management of projects has a very poor record in developing countries (Galliers et al. 1998; Qureshi 1998; Heeks, 2002b; Mgaya, 1999). However, a careful review of reasons for failure identifies other factors whose presence or absence determines success or failure of projects. A number of authors have identified factors that affect the introduction of IT into organizations. Heeks (1987, p. 104) summarizes the factors identified by three authors as listed below.

According to Heeks, the four factors identified by Schement et al (1985) are:

1. Occupational control - the degree to which the members of the occupation control the content and schedule their work.
2. Political organization - determines whether there is a group opinion on IT
3. Occupational values - the attachment which members of the occupation group have to values of either innovation, or tradition, in the definition of their role.
4. Emotional satisfaction - how much resistance is expected to the introduction of ICT

The six factors identified by Jones (1981) referred to as MALLET are:

- “Management attitude to change
- “Attitude of staff to change
- “Length of negotiation
- “Learning period required by staff
- “Experience
- “Trade union attitude to change

The four factors identified by Rogers (1976) are:

- “Knowledge and innovations and reinvention
- “External accountability
• “Slack resources
• “Organizational structure

The above factors though observed sometime in the past, have still been cited in recent research by other authors quoted in the following sections. To begin with, Section 2.2.1 examines the output variables which are the benefits to be achieved if the initiative succeeds. The purpose of this is to clarify the goal of ICT projects.

These goals may form a key element of the planning and evaluation processes as described above. In addition, perceptions of, and reasons for ICT implementation are reviewed and help to identify possible key variables.

2.12.1 Output variables

Many benefits can be achieved using ICT in government. However, a word of caution given by Zulu (1994) is that ICT is a means to an end and not an end in itself. The value of ICT lies in its ability to assist the government in finding solutions to its problems. ICT expenditure can only be justified if there are benefits accruing to it and not adopting it for its own sake. Ndou (2004), identified cost reduction, improved quality of service delivery and increasing the capacity of government as some of the benefits accruing to ICT. These benefits and others are discussed below.

1. Cost reduction

Costs can be reduced with regard to storage, time of processing and in some cases reduction in the number of employees. For example, shared and networked databases, save the government space, time and personnel.

2. Improved service delivery

In traditional models of service delivery, delivery can be long and time consuming and people can queue for many hours expecting to be served. This is costly in terms of man hours lost. An ICT system can improve on service delivery time by being accessible at many points.
3. Increase government capacity

Ndou (2004) observes use of ICT for the reorganization of internal transactions, communications, and interrelationships and for easy information flow and transfer offers considerable opportunity to increase government capacity. This view is advocated in Kawalek et al (2003) with an argument for integration between government directorates. This was expected to increase government capacity by supporting wider information access and information exchange functions both at ministerial and national levels.

4. Improved decision making

According to Caffrey (1998), networked persons can create forums, continuous interaction and communication between themselves and share ideas without having to move. Accordingly, this leads to building trust in government and increased chances of knowledge creation. Caffrey further notes that ICTs enable information sharing within and between governments, citizens and business resulting in similar benefits.

5. Transparency and accountability

Heeks (2004) gives an analysis of how corruption can be controlled using ICTs. A case study in Cameroon showed that ICT can open up government decisions and actions to public scrutiny. The transparency afforded by ICT can prevent clerks from delaying procedures hoping they can extract a bribe. By removing intermediaries, ICTs can cut gatekeepers and hence reduce bribery. According to Heeks, this also works well when businesses have to find, bid and tender details online without having to bribe an intermediary to get the information.

6. Improved efficiency

Qureshi (1998, p. 128) observes that the "introduction of ICT in government would serve as a catalyst to bring about greater communication and collaboration". ICT would develop lines of professional collaboration and provide access to information concerning administrative and managerial reforms. Heeks (2001) notes that everything that ICT does can be done using some other means.
However, its ability to reduce costs of information tasks means it can help humans to do things more efficiently. Heeks (2000) identifies the potential of ICT in supporting public sector reform as automating information processing, assisting existing decisions making processes and supporting the creation of new ICT executed processes. Zulu (1994) note that apart from the above benefits, other benefits may accrue due to change in technology, for example improved access to information.

2.12.2 Categorization of ICT failure

This section discusses ICT failure and its categorization. According to Heeks (2002b), broadly, the assessment of worth of an ICT venture focuses on considerations of the success and failure of IS. An analysis of ICT failure, it is assumed will help identify key variables and provide us with important lessons for formulating successful strategies for the planning, development, implementation and management of information systems. According to Sauer (1993, p. 4), "an information system should only be dubbed a failure when development or operation ceases, leaving supporters dissatisfied with the extent to which the system has served their interests". Further, (p. 24), "failure is an explicitly evaluative term and implies a problematic and undesired situation" and it is a natural response to wish to remedy it.

He observes, "It would be desirable to have an account of failure which indicates both where to look for the causes of failure and how to respond". This description of failure may fit well while dealing with information systems which are partially functional. However, when information systems are included within ICT, failure even after the initial success may still occur when facilities are left unused and the stakeholders dissatisfied. The following part of this section looks at various categories of ICT failure.

While discussing dimensions of ICT failure, Beynon-Davies (2002) considers both the horizontal and vertical dimensions of the informatics model. The horizontal dimension is expressed in terms of the difference between development failure and use failure. The vertical dimension is expressed in terms of failure at the level of ICT systems, IS projects, or organization, or at the level of the external environment. Beynon-Davies (2002, p. 201) identifies six types of IS failure as follows:
Technical failure. Failure of hardware, software, and communications, such as system crashes. Project failure. Failures in project management and control, such as cost or time overrun. Organizational failure. Failures of a system to deliver organizational benefits, such as decreases in efficiency or effectiveness. Environmental failure.

Failure caused by changes in environmental factors such as changes in regulation and labour relations. Developmental failure. Failure that occurs when the whole or part of a system is abandoned prior to implementation. Use failure. Failure that occurs during the post-implementation trajectory of some ISs.

This failure is evident if a system is abandoned after a period of use or if a system is subject to a large amount of adaptive maintenance. Beynon-Davies supports the argument with several case studies and quotes other models for IS failure put forward by Lysine and Hirschheim. (1987).

These authors identify four major categories of failure as correspondence failure which is due to lack of correspondence between objectives and evaluation, process failure which is characterized by unsatisfactory development performance, interaction failure which is characterized by lack of usage of the system, and expectation failure which is characterized by inability of an IS to meet a specific stakeholder group's expectations (Beynon-Davies 2002).

According to Heeks (2002b), overall, ICT success or failure in developing countries can be categorized into three, depending on the degree of success. First is the total failure of an initiative never implemented or in which a new system was implemented but immediately abandoned. Second is partial failure of an initiative, in which major goals are unattained or in which there are significant undesirable outcomes. Associated with partial failure is the sustainability failure where an initiative first succeeds but is then abandoned after a year or so. The last is success of an initiative where most stakeholders attain their major goals and do not experience undesirable outcomes. Heeks admits that, success/failure categorization runs into some immediate difficulties that might not be easy to solve. The first difficulty is that of subjectivity of evaluation.
which viewed from different perspectives, one person's failure may be another's success.

This means some limits have to be applied while evaluating success or failure. The second difficulty identified is the timing of evaluation where today's success may be tomorrow's failure. For the purpose of this research, Heeks' categorization was used to categories projects implemented by the Indian government but this was adapted with ideas from Beynon-Davies.

Some authors observed that literature understanding development country information systems success and failure is deficient. For example Heeks (2002b, p. 103) states that “such writings have been poor at explaining causes; poor at identifying responses to failure; and that work is too normative and prescriptive, failing to take account of the many differing contexts in which information systems are implemented'.

However, development partners have established websites here some current literature is found though in some cases it is not very clearly presented. Some of these websites have relevant case studies (e.g. Development Gateway 2004; I connect online 2004; Heeks 2003c). They also have links to development partners' websites including the World Bank, Department International development and International development research Centre of Canada.

The lessons learned from the above section which are those applicable to this research are that of identifying the occurrence of failure and its categorization. Beynon-Davies (2002) identifies the various aspects that may constitute failure and this knowledge was used in this research to help identify the cause so failure. For example he cause so f technical failure that result in the failure of hardware, software and network systems can be identified through designing in term view questions at pin point them. Knowledge acquired from Heeks' categorization, especially n sustainability failure, can be used in the design of interview questions at pin point the sustainability issues associated with ICT projects.

However, determining failure as Heeks (2002b) observes, is not a straightforward affair. This shows a researcher has to be careful before assuming that a
project has failed or not. In addition, the researcher has to bear in mind the status of failure as specified by Sauer (1993).

Categorization helps to reduce evaluation to manageable level and knowledge acquired from this categorization was used to help synthesize variables found in Indian.

2.12.3 Factors for failure

This section examines the factors for failure which are those occurrences that constrain proper and smooth implementation of ICT projects in government. These can either be barriers or inhibitors as described by Khaled (2003), Gakunu (2004), Aineruhanga (2004), Heeks (2003a), Ndou (2004), Bhatnagar (2003), Zulu (1994), Marble (2003), Somers & Nelson (2001), Bii & Gichoya (2006) and Shakir (2000).

A. Barriers For the purpose of this research:

Barriers can be considered as those occurrences that Prevent ICT implementation. These barriers have been extracted from current literature on ICT and ICT in developing countries and from websites of development partners.

1. Infrastructure

Infrastructure is an important aspect of ICT and is emphasized across all literature dealing with ICT implementation. For example, Zulu (1994) declares that it is the main challenge to any ICT project. Zulu (1994) and Tapscott (1995) observe that failure of ICT projects is primarily caused by a lack of sufficient computers and networks. According to Davison et al (2000), telecommunication infrastructure is inadequate in developing countries while internetworking is required to enable sharing of information and open up new channels for communication and delivery of new services.

Apart from telecommunication bottlenecks, Nulens (2000) emphasizes the importance of electricity to ICT implementation and observes that the low quality of electricity networks in Africa causes power fluctuation that affect ICT facilities. The
underdeveloped technological infrastructure was also noted at the World Summit on Information Society WSIS (2004).

2. Finance

Heeks & Davies (2000) and Gakunu (2004) observe that technology costs money and money is always in short supply in every organization especially in the public sector where there are competing needs. Funding as a barrier is cited in most of the literature on implementation (Heeks 2002b; Heeks 2003b; Doherty et al. 1998).

Aineruhanga (2004) states that, specifically in Indian, ICT investments expected to be injected into ICT between 2003 and 2007 were likely to be about 0.27% of the GDP which is too little in comparison with the projected ICT sector average annual growth of 5%.

3. Poor data systems, integration and lack of compatibility:

According to the Balancing Act (2004), data systems are a problem especially for integrated systems. Heeks & Davies (2000) give the example of a plan in Singapore to integrate various systems which encountered difficulties after it was realized that many systems could not communicate with each other. As a result, data errors and inconsistencies occurred.

Common data across systems were at times not updated simultaneously, resulting in inconsistent or inaccurate information. There was also a lack of standards for programming as well as inadequate documentation of systems which caused some delays in maintenance and enhancement. In the developing countries where very few public sector workers are computer literate, this can be a problem.

In another article, Heeks (2002) gives an example of limited and scattered data in a new Environmental Information network in Ghana. Further, Heeks (2002a, p. 11) quoting Cain (2001) observes, "in many African countries, data quality and data security -for example - are very poor, and there renew mechanisms to address these issues ".

4. Skilled personnel

Zulu (1994) argues that education and training are crucial elements of ICT implementation while Qureshi (1998) argues that training has to be provided in order to develop skills in the use of ICT systems.

Zulu (1994) also mentions the issue of the few qualified ICT engineers to service and maintain ICT hardware and software while Qureshi (ibid) observes that the sustainability of the ICT projects depends on local expertise for maintenance and support, a point also supported by Backus (2001).

5. Leadership styles, culture, and bureaucracy

According to Galliers et al. (1998), in applying sophisticated technology, gaps can be revealed between it and the various cultural elements relating to the organization such as style of functioning, its management skills and the shared values of personnel within the organization and within society at large.

The social context is cited by Davison et al. (2000, p. 5) who observe "the notion that technologies can prescribe their own course of action is mythical the responsibility for technological outcomes lies in the social order -individuals, groups and institutions - through which lives are organized".

The Indian National ICT Policy also emphasizes the importance of ICT leadership, ownership and political goodwill (Government of Indian 2006e).

6. Attitudes

If government officers do not have the right attitudes, then they will not be motivated toward using ICTs, denying the initiative key support. For example Heeks (2004, p. 27) observes that "knowledge and skills are important but so too are the right attitudes". One problem with developing countries is a lack of interest from senior officers.

For example, Qureshi (1998) points out that in many developing countries, leaders do not bother to utilize the formal information services of the national system that they have decided to set up and have invested public funds in. In some cases, senior officers do not appreciate the importance of effectively using computers as captured in the following statement: "It appears that when setting up information systems in most
countries, the emphasis has been placed on the supply of information services rather than on mobilizing anticipated demand.

This difficult task involves teaching the basic skills of finding and handling information; acquainting users with the sources of information that they require in their professional tasks and daily occupations; updating researchers, educators and practitioners as well as generally stimulating the habit of seeking information and using it effectively” (Qureshi 1998, p. 125).

7. Technology acceptance

As described by Davis (1989), users' attitudes towards the technology, and their subsequent intention to use it can determine the acceptance of ICT. Perceived usefulness of an ICT and the perceived ease of use will either hinder or encourage the users to adopt and adapt to a new technology.

If not accepted, a technology will lie to waste even after implementation. This is further explained in section 2.3.2 on previous models. This suggests that research into the effects of attitude on ICT implementation and use is needed.

B. Inhibitors

This sub-section describes inhibitors that do not necessarily prevent the implementation of ICT projects but do prevent advancement and restrict successful implementation and sustainability.

1. User needs

Davison et al. (2000) observe that, technology diffusion must be local-user focused rather than donor or technology focused. Qureshi (1998) has also observed that IS in most countries has focused on supply of information services rather than on mobilizing demand.

Qureshi (1998) suggests that if the information technology is seen as being imposed upon organizations, its use would be prejudiced from the outset. If, on the other hand, the technology is seen as a motivating factor for certain people, then it will be seen as an impetus.
2. Technology

Heeks (2002b) observes that some of the ICT applications may contain "deep inscriptions" and for them to be successful, they might require or impose a strong set of processes, values, competencies and systems. Heeks (2002b) cites a decision support system that requires or imposes a series of conditions including skills, organizational culture, politics and presence of organizational strategies as an example. If the deep inscriptions are not met, failure is inevitable.

However, if the technology imposes fewer inscriptions, for example, word processing applications, success may be achieved. Avgerou et al. (2000) Observe that ICT potential cannot be realized by simply transferring technologies and processes from advanced economies to developing countries and technology leapfrog, discussed by Davison et al. (2000), may not necessarily take place after the transfer of technology.

3. Coordination

Zulu (1994) suggests that in order to coordinate the various activities, national ICT councils or directorates should be established to articulate future policy requirements. Further, according to Odedra (1993), financial problems may not be the real issue but the issue is the lack of coordination while implementing ICT projects. The importance of coordination is also noted by McConnell International (2001) and Dou (2004).

4. ICT policy

Ndou (2004) suggests that the implementation of government informatics requires rules, policies, laws and legislative changes to address activities including freedom of information, data protection, computer crime and copyright issues. He finds their notes that appropriate policies mitigate against haphazard ICT implementation in government where individual departments implement projects. In many developing countries, ICT policies are still to be formulated though this was recommended at the World Summit on the Information Society held in 2003 (WSIS 2004).
5. **Transfer of ICT idolizers**

Idolizers (often called champions), are those who believe in the benefits of ICT and are very crucial to the success of an ICT project (Heeks 2001). Idolizers are not permanent in their positions especially where there is political patronage of appointments. According to Heeks (2001), this staff and skills dimension increases the design actuality gap during implementation which leads to failure.

6. **Donor push**

Donors can push for implementation of various projects that they believe can help developing countries. However, as Heeks (2002b) argues, this can result in designs developed in the developed countries being implemented in the developing countries without due consideration of the local conditions. This often results in a design actuality gap and, therefore, IS failure.

Heeks gives an example of an aid-funded project in the Philippines that was designed according to an American model that assumed presence of skilled programmers, skilled project managers, and a sound technological infrastructure all of which were non-existent. Bii and Gichoya (2006), observe that an ICT project implementation can be a consequence of a donor's suggestion rather than a result of a strategic information policy plan. The above section provides an indication of the factors for failure as observed by other researchers and hence form a foundation for this research.

2.12.4  **Factors for success**

While discussing factors for success and failure, it is necessary to clarify the "opposite" effect of most factors. This means if the presence of a factor encourages success, the lack of it encourages failure (examples are, proper infrastructure and well-motivated staff).

The converse is true such that if presence of a factor causes failure, its absence will cause success (examples are bureaucracy, poor project and change management). This observation is considered true in most cases.
However, in some cases it may not hold for example, too much donor push is a problem, but too little could be a problem too. Donor indifference could mean that there is not enough incentive to see a project through completion.

A. Drivers

Drivers, in the context of this research, are the factors that encourage or reinforce the successful implementation of ICT projects. Their absence can cause failure and their presence can cause success. The views on drivers expressed in the literature are described below:

1. Vision and strategy

Strategic plans are designed to close the gap between the current state and the future state as visualized in the organizational mission (Moran 1998). According to Moran (1998) and Riley (2000), a vision can guide a project team to move from a current state to a future state within an organization. Doherty et al (1998) stated that, a strong focus on strategic and operational needs could lead to successful implementation. Graves (1998) is more specific, stating that a strategic framework can involve prioritizing and funding those areas of technology which are most strategic to the organization's mission, for example efficient Documentation or information sharing within government.

2. Government support

Government support can be viewed as an internal political desire. This is the drive from key government officials for reform and for achievement of e-government goals. A review of various country reports indicates that successful ICT projects have to have good government support (Ndou 2004, Bhatnagar 2003, Riley 2000, Chia et al. 1998, MAMPU 2003). This ranges from financial support, through to staffing and project monitoring.

Government support is seen in the UK, Malaysia, Hong Kong, Singapore, the USA, and Canada and on various e-government websites for various countries. In all
the successful cases, the top government office (usually the prime Minister's office or the cabinet) is directly involved. Heeks (2003b) describes case studies in Brazil and Mexico, e-procurement projects and the Douala port ICT project in Cameroon which indicate fill government support.

It has been observed that in Rwanda the President chairs ICT meetings (Government of Indian 2004). As observed by Marble (2003), in the appropriate domain senior, management support is a crucial factor for the success of implementation, An observation made also by Wixom & Watson (2001).

3. External pressure and donor support

According to Heeks (2002b), external pressure dominates the flow of resources and artefacts from developed to developing countries rather than, for instance, between developing countries.

The donors overall purpose of development is the creation of economic rationalism within developing country economic systems. Heeks (2002b, 36 p. 107) argues that ICT is seen as a key tool in achieving this, and becomes part of a "technologically rational and technologically determinist agenda that focuses on the Digital divide".

Heeks (2004) later states that external pressure can also be increased by NGOs (non-government organizations) and civil societies, through citizens and citizen groups. Also, from a newspaper article by Mugonyi (2003), suppliers and consultants can also be seen to exert pressure.

4. Rising consumer expectations (internal pressure)

This can be seen from the various comments carried by the news media as regards ICT application (Limo 2004; Nderitu 2004; Limo 2003). Rising education and skill levels, better media and information available to citizens has reduced the barriers to ICT use.

Furthermore, increased citizen's expectations and increased awareness of citizenship have led to demands for more responsive, flexible and effective government (Khaled 2003) which tends to imply the use of ICT. Khaled notes that the advent of
ICT in terms of providing information around the clock has meant that many governments can now provide access to electronic documents twenty-four hours a day.

5. Technological change, modernization, and globalization

According to the Economic Commission for Africa (2001), globalization has created a pressure on governments and other organizations, both in developed and developing countries, to introduce ICT as a means of increasing capability both for internal operations and for external information interchange.

Heeks (2002b) argues that the activity of globalization has strengthened and enabled ICT investments in developing countries by carrying out ideas and systems from developed countries to developing countries.

B. Enablers Even in developing countries:

There are several active elements present in society, which help overcome the potential barriers.

1. Effective project coordination and change management:

Project management includes defining clear responsibilities, good planning and consideration of risks, good monitoring and control, good organization of resources, and well-managed partnerships between public agencies and the private sector (Heeks 2004). According to Net corps Canada International (2003), three keys to success in planning an ICT project are ensuring that it is valuable, feasible, and sustainable.

A poorly managed project rarely succeeds as shown by the failure of many ICT projects, such as the Social Investment Fund in South America described by Merrick & Heeks (2004). Bhatnagar (2004) suggests an organizational structure or government formats: "A champion at the political level" Ministerial level co-ordination committees "A central support group “Departmental champions and a co-ordination committee “An institution for training “Private sector partners In the case of a specific ministry, the above can be adjusted to include sectional Champions.

The presence of a champion is supported by Wixom & Watson (2001) in relation to data warehousing projects. To improve or to make a technology more
efficient normally results in change which the majority of stakeholders may dislike and resist (Jackson, 2001).

Change management enables the minimization of the impact of change by managing, tracking and optimizing changes (Front Range Solutions 2003). According to Jones & Williams (2005, p. 15), "technology needs to be part of a wider change management strategy and staff need to be fully engaged in the changes required to how they work Time and again the reasons that ICT-enabled projects fail is not so much about technology as about the way in which ICT was managed and implemented'. Bhatnagar (2003) observes that change management, as an enabler, requires 40% of resources for the success of e-government.

Change management includes leadership with a project champion, use of incentives to create commitment to and ownership of an ICT project, and stakeholder involvement to build, support, and minimize resistance. Heeks (2003a) observes that change management helps to answer the "what's in it for me?" question for all key projects stakeholders. Ciborra (2003, p. 8) further observes that, "huge efforts of change management and training are required to overcome resistance; to educate the computer illiterate and to Change the management model". This, Ciborra says will imply a radical cultural transformation for moving from a rigid, control oriented management style.

2. Open source software

To save on royalty payments, open source software for the public sector should be encouraged as recognized in the National ICT policy document (Government of Indian 2006e).

3. Availability of skills and training

An analysis of factors affecting ICT implementation by Wixom & Watson (2001, p17) notes that "highly skilled project team members increase the probability of project being finished efficiently without time and budget outruns".

According to the Indian government strategy, training is a considered a major enabler for the success of e-government (Government of Indian 2004). There is therefore a need for training in project management, change management and use.
4. **Good practice**

Good practice can be defined as real life solutions with actual usage which represent leading edge experience, though not necessarily the best, ideal or unproblematic (EIS 2004). Accordingly, good practices can provide useful learning experiences for others, likely to stimulate creativity, 'self-reflection and the transfer of good ideas. According to EIS (2004, p. 2) good practice can be acquired through "straightforward replication, copying with local adaptations, learning from good practices elsewhere followed by developing a specific solution suitable for their own socio-cultural context or exchanging experiences and discussing future evolution between several good practices implemented in different administrations".

One objective (objective 6) of this research is to determine whether good practice from elsewhere can be applied in developing countries where models for ICT implementation are lacking.

5. **Political power play**

The power to perform and enforce certain actions comes from the political power. Silva (2002) argues that the effectiveness of an act of improvisation is greatly influenced by political factors. Silva notes that 'power to' is a fundamental characteristic of the organizational agent performing an improvisation while implementing a system and is an important factor. The above section has identified some of the factors that determine success for an ICT project in government.

It has also been observed that, viewed in a different way, some of the factors for success are the same as those that cause failure, in which case the absence or presence of a factor results in success or failure.

A factor for success, such as training, has been considered an enabler. It is these assumptions that this research tries to verify. The use of open-source software is another factor that has been suggested as an enabler will also be investigated in this research, along with the other possible factors that may affect success and failure in Indian.

Theoretical frameworks for evaluation and implementation this section reviews literature on the evaluation and implementation methodologies that relate to this research. The section therefore provides background knowledge on previous frameworks for evaluation and implementation and indicates their limitations.
The section identifies some useful models that highlight further categorisation of success and failure. Khalifa et al. (2004) define ICT evaluation as establishing quantitative and/or qualitative methods to assess the value of ICT in an organisation. This generally takes the cost/benefits method of valuation including both the tangible and intangible benefits and costs.

The entity to be evaluated is an ICT project and its goal is a successful implementation. The benefits cannot be evaluated and performance cannot be judged as good or bad without the successful implementation of the project. For the purpose of this research, the technical or operational implementation of ICT infrastructure is of particular interest.

Evaluating ICT projects can be quite problematic and can sometimes be quite subjective as shown by Heeks (2002b), Currie (1995), Bannister & Remenyi (2000, 2004), Iran (2002), and DeLone & Mclean (2002). Further, Khalifa et al. (2004) suggest there is no single ICT evaluation method that can be applied to all situations. Currie (1995) justifies this position using various case studies drawn from businesses in various developed Countries, while Heeks (2002b) observes that evaluation is subjective and can depend on circumstances, including time. Currie (1995) notes that finding appropriate performance indicators for ICT in the public sector can be difficult and further observes that the majority of academic literature on ICT evaluation shows a preference for the use of financial measures (management accounting techniques), such as net present value (NPV), accounting rate of return (ARR), cost-benefit analysis and internal rate of return (IRR) Over non-financial (intangible) measures.

Others mentioned by Bannister & Remenyi (2000, p. 231) are productivity measures, such as return on investment and information economics.

As observed by Sauer (1993, p. 4), "an information system should only be dubbed a failure when development or operation teases, leaving supporters dissatisfied with the extent to which the system has served their interests". According to Sauer, a system has not failed if it is serving some interests.

This observation is similar to what Heeks (2002b) refers to as partial failure. Though the argument was in reference to IS, it is applicable to ICT which includes IS, as is the case with most e-administration projects. One reason for the lack. Of
achievement of expected benefits despite the large ICT budget is perceived by some, for example Currie (1995), to be the failure of senior managers to align ICT evaluation procedures and techniques with strategic thinking.

Currie further notes that this problem is likely to arise from the rapid rate at which technology is introduced into the market place, leaving managers confused as to whether specific Technologies will be appropriate for their organization. According to Khalifa et al. (2004), an organization may perform technical evaluation on how the system functions via performance measures.

This technical evaluation is concerned more with the technical performance of the system, than the performance of the System to deliver benefits at the desired costs. ICT performance indicators include systems availability, response times, transaction processing times and network traffic.

However, As Hurst & Doherty (2003) observe that these useful evaluations do not constitute the very essence of failure. They observe that "social and behavioural factors are more important aspects of information systems failures than technical, (Ashurst & Doherty 2003, p. 20).

From the above review, the author of this thesis observes that a technology like ICT, which deals with an intangible resource (information), must have some intangible benefits that cannot be measured sufficiently by normal accounting techniques.

2.12.5 Previous models for ICT project success

Several models for assessing success, failure and the way forward for ICT systems in general (DeLone & Mclean, 2002), Beynon-Davies (2002) and in developing countries (Heeks, 2002b) have been suggested. These and other models are considered relevant to this research.

The model shown in Figure was originally proposed by DeLone & Mclean (1992) and later overlaid on a simpler scheme of functionality, usability and utility by Beynon-Davies (2002). This overlaid model introduces the idea of functionality and Usability, which are considered relevant to ICT implementation.
DeLone & Mclean (2002) acknowledged the difficulty in defining information system success and noted that different researchers address different aspects of success, making comparisons difficult and the prospect of building a cumulative tradition for IT system research similarly elusive. DeLone & Mclean (2002) reformulated their model which is given in Figure. The reformulation was done after a review of comments and suggestions made on the previous model by various writers (DeLone & Mclean, 2002).
**Figure-2.12.2: The reformulated IS success model by DeLone & Mclean**

From the two figures above, both system quality and information quality aspects and the accrued benefits which are crucial components, are considered important in the determination of success or failure of ICT implementation.

The above two models are related to technology acceptance model (TAM), which seeks to explain the use of ICT by focusing on the user's attitude towards the technology, and their subsequent intention to use it (Davis 1989). Perceived usefulness of an ICT is defined as 'the degree to which a person believes that using a particular system would enhance his or her job performance' while perceived ease of use is defined as 'the degree to which a person believes that using a particular system would be free of effort' (Davis 1989).

The above perceptions determine the rate or the degree at which technology is adopted. However, as shown in this thesis, failure of ICT infrastructure implementation is not largely affected by technology acceptance which may not arise for example if there is no money to implement the system. Further, the literature reviewed shows other crucial factors that affect ICT implementation in government, such as user needs and technology acceptance, particularly for the information systems se.

The ITPOSOMO (Information, Technology, Processes, Objectives and values, Staffing and skills, Management systems and structures, Other resources) model developed by (Heeks 2002b) and shown in Figure 2.3, seeks to explain the high rates of failures of information systems in developing countries. The model draws on contingency theory to advance the notion of design-actuality gaps: the match or mismatch between IS designs and local user actuality. The gaps between design and actuality can be assessed and rated using, for example, low, medium, and high levels. These ratings are supposed to show the degree of mismatch between the seven dimensions.

Heeks' model uses the country context gaps and hard-soft gaps to show how technology planning and implementation paradigms prevalent and working in the developed countries cannot be used for evaluating success or failure of IS projects in developing countries.
This model assumes the designers of IS are remote which means their contextual inscriptions are liable to be significantly different from user actuality. Heeks assumes the designers come from developed countries or have been trained in developed countries and their knowledge of the local circumstances is at variance with the local reality. It can be observed that the design-actuality aps model demonstrates one aspect or looking at failure in developing countries.

In some cases, design is done in the developing countries here actuality is supposed to be known and yet implementation fails due to other factors that are investigated n this research. This suggests at the model could be used to explain some the reasons why implementation of ICT in the Indian.

Information Technology Processes Objectives and values Staffing and skills Management systems and structures other resources I Actuality

![Diagram](Image)

**Figure-2.12.3: Design-actuality gaps - ITPOSMO (adopted from Heeks 2002b)**

The first two models deal with ICT/IS in general but Heeks' model is for ICT/IS implementation in government and especially in developing countries. Heeks' model focuses on the gap between the assumptions inscribed in the technologies developed in
the context of the industrialized countries and the prevailing way and state of organizational life in the developing countries which is also supported by Sahay & Avgerou (2002).

Sahay and Avgerou observe that this knowledge is not new and builds on the academic discourse of the 1990s. All these models act as useful guides in highlighting some of the key variables that affect ICT success and help shape the identification of areas of weaknesses in ICT implementation in Indian government.

From the DeLone & Mclean model, it is observed that functionality depends on ICT systems and usability and utility are crucial in determining stakeholder satisfaction, which increases stakeholder acceptance, and reduces resistance to adoption. However, these aspects are not dealt with in this research in depth because they are assumed not to affect ICT implementation because the goal is to have working systems. The user perspective is considered outside the scope of this research.

2.13 Government ICT initiatives

Countries have been classified by the United Nations according to their Computer Industry Development Potential (CIPD) as advanced (developed) or less developed (developing). Advanced include, for example, the United States, Canada, West European countries and Japan; developing countries include, for example, Argentina, Brazil, India, Mexico, Indian and Bulgaria (Mgaya 1999). Mgaya observes that the classification is influenced by the social and economic development of these countries. According to Odedra & Madon (1993), growth in ICT applications in various countries is influenced by the characteristics of their individual economies, local infrastructure, education and training, availability of skilled personnel and their existing ICT policies, both explicit and implicit.

Ifinedo (2005) suggests that countries with lower competitiveness in the global networked economy are synonymous with those on the wrong side of the digital divide. Mgaya (1999) argues that ICT issues in advanced nations appear to be driven by strategic needs whereas, in less developed countries they are driven by operational and ICT infrastructural needs.
Literature shows the use of ICT for social economic development in developing countries has received much attention in recent years (Mgaya, 1999; Avgerou & Walsham, 2000; Bhatnagar, 2002; Bhatnagar, 1990).

2.13.1 Initiatives in Developed countries

According to Heeks & Davies (2000), recent years have seen the emergence of the information society as a political agenda of the Western countries. They further note that the use of ICTs for government reinvention is increasing not only in investment but also in terms of visibility with a number of high-profile initiatives having been launched during the 1990s, especially in the developed countries.

According to Mgaya (1999), in many developed countries, the state is the largest single user of computers and through its policies and regulations exerts the greatest influence on the diffusion of ICTs throughout the country. Audenhove (2000) states that Western countries are convinced that the information society will result in economic and social benefits.

He notes, quoting OECD, that information infrastructures are expected to stimulate economic growth, increase productivity ratio bus, and improve in the quality of life. Heeks (2002b) observes at there is a big difference between ICT implementation and use between developed and developing countries. However, similarities an also expected observed Westrup (2002).

Theses similarities could include ends which are ever sufficient, bureaucracy and user needs. The difference is how problems read addressed in different countries. Westrup, (2002) argues that, with their adequate sources and advanced technology, for Western countries, implementing ICT projects is easier than for developing countries. Riley (2000) gives a good review of government-in iterative in the late 1900s for a number of leading developed countries. The next sections summaries his main findings (of case studies) for the United Kingdom, Canada, the United States and Hong Kong.
2.13.2 Initiatives in the United Kingdom (UK)

The UK government in its 'Strategy for wired world' developed an overall strategy on the delivery of services (Riley 2000). Fortunately, in the UK, ICT is given a high profile through political leadership where the office of the Prime Minister (PM) is consistently promoting the new technologies and the government values being on the Internet. This is clearly demonstrated by the PM having a website and the public being encouraged to visit the website.

The responsibilities for IT are well defined with the minister responsible for public service having responsibility over all manner of IT initiatives. A division in the Cabinet Office, the Central Information Technology Unit, has had responsibility for the development and implementation of policy initiatives, such as the 1996 Green paper and the 1999 Modernizing Government initiative.

The Central Information Technology Unit is also responsible for assisting departments in their implementation of the various IT innovations and initiatives. Central Information Technology Unit is also responsible for Information Technology policy and strategy that spans government departments and for the promoting the use of IT in the delivery of government services to the public including the security and privacy aspects.

2.13.3 Initiatives in Canada

In 1994, the Canadian government released a document entitled Blueprint for Renewing Government Services using Information Technology (Riley 2000). Canada, as a country, identified some guidelines for the application of the ICTs across the full spectrum of government operations, including the electronic delivery of government services.

To achieve this, the government created an Information Highway Advisory Council. The council was mandated to examine how the country could best use the advancing technology of the internet and other digital technologies to meet various objectives (Riley 2000). The council gave various recommendations - among them one
about the government being a role model in the cost effective use and promotion of ICT, training and leadership.

### 2.13.4 Initiatives in the United States of America

On the USA, Riley writes about the re-invention of government when electronic services delivery initiatives became a major federal policy goal. The initiative originally known as National Performance Review, was started early in 1993 with an initial task of creating "reinvention laboratories" within agencies to pilot innovations in service delivery and reduce red tape. The initial focus was clearly on cost-cutting, leading to a federal workforce reduction of some 250,000 positions, and a 50% reduction in internal Government regulations. In 1993, the Information Infrastructure Task Force was formed to implement policies and initiatives necessary for deployment of the National Information Infrastructure. Its tasks were to, improve the accessibility of government information, upgrade the infrastructure for the delivery of government information, enhance citizen access to government information and strengthen inter-agency co-ordination using electronic mail.

### 2.13.5 Initiatives in Hong Kong

Hong Kong has used ICT within government for number of years (Riley 2000, p. 55). The most significant challenge in Hong Kong is the issue of the use of two languages, English and Chinese. In 1997 and 1998, the Hong Kong Chief Executive, in his policy address to the Legislative Council, stated his vision to make Hong Kong a leader in the information world. His strategy was to encourage and assist the private sector in a move towards electronic commerce.

The result was the setting up of the Information and Technology Broadcasting Bureau later known as Communications and Information Branch. The goal, of the Communications and Information Branch is to lead and coordinate the work of all those in the government involved in IT and the related areas of broadcasting and telecommunications.
2.13.6 Initiatives in Singapore

Chia et al. (1998) in their paper on information technology and the internet in Singapore, describe how the island nation adopted a strategy to spur economic growth by using ICT as the strategic tool. They describe the Singapore government ICT plan for the 1990s and beyond. According to them, in 1980, the first formal information technology policy was heralded and the Committee on National Computerization was established with the aim of harnessing the power of IT.

This led to successful computerization of the civil service during the 1980-1992 periods. To exploit IT as a tool for economic growth, the National Computer Board was formed in 1986 to coordinate the implementation of Singapore's first IT policy. The most impressive result of this policy was the successful computerization of the civil service. This effort improved the efficiency and productivity of the civil service and provided the much needed showcase for the private sector to emulate.

Chia et al. (1998) mention the various challenges that were faced in the path to computerization. These were the technology barrier due to existence of diverse systems that needed to be interfaced together, security, confidentiality, authenticity and data integrity, competition with other countries and limited manpower resources. However, all these challenges had been planned for and were overcome and that is partly why Singapore shines as a newly developed country.

2.13.7 Common aspects of developed countries' initiatives

The conclusion from the last section can be drawn that all the developed countries initiatives have certain characteristics in common. These are summarized below. “Establishment of a central coordinating body” Policy initiatives “Political support ” Need to offer better services to the citizens " Vision " Involvement of the private sector With regard to the differences between developed and developing countries, Chen et al. (2006) identify the differences that give developed countries an advantage over developing countries in the implementation of e-government.

They identify history and culture, technical staff, infrastructure, citizens and government officers as some of the factors creating this difference. Although Riley's
report gives a comprehensive and thorough review of certain countries, he has not contrasted these initiatives with those in developing countries and his work now needs to be brought up to date with the recent initiatives of the last three years.

This is especially after the World Summit on the Information Society in 2003 mentioned in chapter one. The above common factors for developed countries are used as points of reference in the investigation of the Indian e-administration implementation scenario.

2.13.8 Developing countries' initiatives

In a report by the published by the Commonwealth, the need for establishing ICT advisory boards was mooted early in 1980s (Kaul & Odedra, 1991).

Among the functions of these boards was to formulate policies and guiding principles for the acquisition of facilities, serve as an advisory board for coordination of the acquisition of facilities and carry out service bureau operations for government departments. Kaul & Odedra (1991) observe that most of these organizations have been ineffective for various reasons ranging from lack of power and authority, a lack of cooperation among members and a lack of technological awareness among members. At this early stage, these authors analysed the co-ordination mechanisms, fiscal incentives, ICT policies, infrastructural development, human resources, major information systems, and application areas.

India featured prominently as one of the African countries that had an early initiative for computerization of the public sector. Some of the recommendations of the report were: redefinition of the roles of the coordinating bodies, formulating coherent policies and strategic planning to determine priority areas.

Kaul and Oder’s 1991 report is now clearly outdated, though the ICT co-ordination and implementation in Indian is still under the Ministry of Finance. Part of this research will be to update this information in view of the recommendations set out in this report.

Recent research on ICT in developing countries has cases of successful examples of computerization and frustrating stories of systems that have failed (Heeks,
2002b). Between are various examples of projects that can only be categorized as partial success (Avgerou & Walsham, 2000; Heeks, 2002b). Avgerou & Walsham (2000) identify two polarized views in the literature.

The positive view emphasizes the potential of new ICT to promote development and advocates intensive efforts for transfer of technologies, management practices and organizational processes from the West.

The alternative view counters this by pointing out those technologies and processes that have proved useful in the West are inappropriate for the social and cultural conditions applying in many developing countries, and thus can cause damage to the fabric of local societies. Interestingly, Avgerou & Walsham view the techno-enthusiasm as utopian and the ant technology view as a paralyzing attitude. In this research, both views can be considered. As technology, social and cultural conditions have been seen as factors for failure, this suggests research is required to find out to what extent they affect ICT implementation.

Various case studies have been carried out in developing countries and are summarized in literature such as those mentioned by Heeks (2003b), Riley (2000), and Odedra (2004).

A specific case is Malaysia where in Vision 2020, outlined by the Prime Minister early in 1991, the Malaysian government proposed several ICT initiatives (Riley 2000). According to Riley, the chosen strategy to achieve Vision 2020 was through leapfrogging the information age.

The e-governance initiative, as one of the multimedia flagship programmers, had several characteristics and applications summarized by Riley (2000, pp. 72-73) and which emphasized the private-public partnerships as an important guiding principle for successful implementation.

According to Ifinedo (2005), reports presented at the World Summit on Information Society (WSIS, 2004), showed that African countries tend not to have the same infrastructural facilities and support as the developed West, and these are, in fact,
prerequisites for the new order. This, Ifinedo (2005) concludes, makes their e-readiness ratings very low.

2.13.9 ICT application in Indian government

In research carried out in 1990 by Palvia & Palvia (2003), it was observed that the computing industry in Indian was greatly influenced by the government. Further, it was observed in the same research that IT was accorded low priority by the government. This, in a way, explains why until recently the government itself lagged behind in ICT implementation and use, though as reported by Odedra (2004) and Kluzer (1990), the Indian public administration was one of the first sectors to use computers starting in the early 1960s.

While arguments for successful implementation can be applied to any government in a developing country, the Indian context may present various challenges that may affect the successful implementation of ICT projects due to the characteristics that define the Indian ICT environment that were listed in chapter one. Presently, it is not clear from any published sources who is in charge of government ICT. If this is true, then it means there is lack of coordination, and yet, coordination is necessary for successful implementation as pointed out by Odedra (1993) and Zulu (1994). Though the government has set up a directorate of e-government, the relationship between it and other bodies dealing with ICT in government is not clear from any published source. Other aspects of ICT in the Indian government are explained in chapter one.

The above section has highlighted the initial approaches to ICT implementation in countries from the developed and the developing world. Political will and the need to automate service delivery have been identified as key drivers to ICT implementation in government. The developed countries with their advanced in restructure are obviously ahead developing countries that have undeveloped infrastructure.

2.14 Action plan for success

The best way to achieve maximum benefit from ICT implementation is to have all the factors for success with no occurrence of the factors for failure. However, in the real world that is never the case. Given such a situation, actions to increase the chances
of success are necessary. Ndou (2004) suggests the following good practices for developing countries to consider for a successful design and implementation of e-government initiatives.

- “E-readiness assessment
- “Raise awareness among public and private organizations
- “Think small, be agile and fast
- “Stimulate collaboration and coordination among government departments and agencies
- Invest in human development
- Show sensitivity to local realities
- Adopt a holistic and comprehensive approach, with clear vision and strategy
- Prepare and manage knowledge and change

The above best practices might not be sufficient but they act as a basis for further research.

2.14.1 Conducting e-readiness assessment

According to Ifinedo (2005), "E-readiness assessment tools and models can be divided into two main categories: those that focus on basic infrastructure or a nation's readiness for business or economic growth, and those that focus on the ability of the overall society to benefit from ICT". The author argues that these tools can be said to be descriptive tools for providing explanation and describing the situation and also diagnostic tools for identifying problem areas.

From the above argument, e-readiness can be seen as the ability to promote and support digital business and information and communications technology (ICT) services (Economic Intelligent Unit, 2005). According to Ifinedo (2005), several organizations and researchers including The Bridges Organization, The Centre for International Development at Harvard University, The Asian Pacific Economic Cooperation and Electronic Commerce Steering Group have come up with measures and indices to measure e-readiness. The e-readiness factor for India is found in Ifinedo’s paper.
For the purpose of this research, e-readiness refers to the government ability to take advantage of the ICTs as a facility to enhance and improve its administrative functions. E-readiness has several components, including telecommunications infrastructure, human resources, and legal and policy framework. E-readiness assessment, as suggested by Clockwork Inc. (2004), should concentrate on: Data systems infrastructure Legal infrastructure

Institutional infrastructure (standardization of various departmental means of communication and the technology that is used) Human infrastructure Technological infrastructure Leadership and strategic thinking readiness (short, medium and long term plans by specific government ministries) similar e-readiness assessment aspects are identified by Iýeeks (2003a) and are listed below:

- “Institutions
- “Laws
- “Leadership neck commitment
- “Human capacities
- “Technology
- “Data systems

For this researcher -readiness assessments considered useful tool that can be used as an information-gathering mechanism for governments as they plan their strategies for ICT implementation. It can help the project team to better understand what impediments to ICT implementation exist and what initiatives are needed to overcome them.

2.14.2 Design divisibility

Divisibility of local design can decrease chances of failure as explained by Heeks (2002b, p. 109) using the Volta River Authority in Ghana as an example. He explains that divisibility is achieved by modularity (supporting one business function at a time by allowing separation of, for example, accounting and personnel functions), and instrumentalism (providing stepped levels of support for business functions by allowing separation of, for example, clerical and management support).
Ndou (2004) identifies these aspects and recommends beginning with feasible projects, tailored to specific contexts. Heeks (2002b) concludes that design divisibility is a prophylactic against failure and should be adopted more widely.

2.14.3 Local improvisations

Silva (2002, p. 1) defines local improvisations as "unexpected actions rooted on intuition and aimed at solving particular crisis". Silva observes that improvisation occurs in three moments which require fulfilling certain conditions. The first moment is a response to a crisis; the second is the act of improvisation itself and third is when the organizational members make sense of the action. According to Silva (2002), not all unexpected actions are improvisations. These have to be intentional and reflect intuition, competence, and design.

An example given by Silva for an improvisation is the use of a pen and paper to register information when a computerized information system is down and users have to register information. According to Ciborra (1999), an improvisation is a situated performance where thinking and action emerge simultaneously and on the spur of the moment. Ciborra further notes that it is a purposeful human behaviour which seems to be ruled at the same time by intuition, competence, design and chance. While improvising, the agent is able to frame and recombine features of their situation, so that they become resources for intervention.

According to Heeks (2002b), local improvisation can be done to reduce design-reality gaps. It can be through hybrids that recognize local capacities and improve success rates.

However, Heeks notes that schemes to develop these hybrids in the developing countries are virtually non-existent and this hampers improvisation. Participative approaches to implementation, for example group working and end-user involvement, and have to be carefully considered since most have been developed for the industrialized countries.
Examples given by Heeks (2002b) of how these participative IS techniques were a failure include Mexico's General Hospital and an end-user development initiative for health IS in South Africa. The implementations failed because of the large gap between design assumptions and requirements and actuality of organizations into which ICT was introduced.

The conclusion drawn, however, is that these implementations failed because there was too large a gap and not necessarily because participative design is necessarily wrong.

In this section, following the review of factors for success and failure, suggested actions for success have been identified. Following the identification of the above actions for success, their presence or absence in India requires investigation.

The findings from India together with findings from others countries and in particular developing countries, are analysed and syntheses to form a part of the research output presented in chapter six. A separate document on recommendations and guidelines presents the

Actions for success in a more applicable way. Further, a more appropriate presentation of the ideas on best practices is required and this leads to development of models and a framework.

2.15 Discussion

No author has reported that proportion of ICT projects in governments in developing countries have failed or succeeded, undoubtedly because this is unknown. This calls for a qualitative research approach that uses the previous models developed to react to specific situations. This thesis reports on the study that was carried out within the mainstream government ministries and their departments.

The study did not include government and other public corporations which implement their ICT projects just like private companies and therefore have different challenges that are outside the scope of this research.
The literature reviewed shows a lack of literature on e-government in developing countries, and a need to research large scale and complex organizations such as the government, and to focus on specific stations to highlight significant approaches (Heeks, 2002b; Doherty et al. 1998; Ndou, 2004; Lam', 2001). Few studies adverb even arrived in mainstream over meets in developing c countries and, to the knowledge of the author; none has been carried out in the Indian government.

Much of the literature on government informatics in India is found in magazines and newspaper as articles, for example by Limo (2003, 2004) and by Nderitu (2004) and there is nothing in respected peer-reviewed academic journals.

Having reviewed the relevant literature derived mostly from developing countries, it is possible to suggest factors that will affect successful implementation of ICT projects in government. These would likely to be modified after the. Gathering of empirical data in India.

A combination of the knowledge acquired from this review and from the field study therefore should provide the necessary background to make suggestions leading to improved ICT planning and implementation in India.

2.16 Summary of key factors for ICT implementation

Based on the reviewed literature and the objective of the study, factors that may affect success and failure of ICT in India have been identified. These can be related to stages on e-government. Figure shows the stages of e-government as described by Khaled (2003). The process involves three stages namely automation, information and transformation. The tasks for each stage are indicated. As suggested by Khaled (2003), the first step is to analyses stages of e-movement implementation and the second to look at issues affecting ICT development in government.

This helps to highlight the particular stage that has not succeeded. However, since ICT implementation in India is largely at the automation stage, evaluation of success can only be done at this stage.
What needs to be considered in this research, therefore, are the factors that contribute to the success of projects at this stage? Suggestions for the next stage can also be made.

![Stages of e-government](image)

**Figure-2.16.1: Stages of e-government**

After identifying the relevant stage, in this case automation, the next step is to try to assess the presence and impact of the various factors for successful implementation of ICT projects. In evaluating the inputs and output variables of the system, the issues of both quality and quantity occur.

For example, it is one thing to have quantitative infrastructure, like many computers and networks, but their quality will determine whether they can efficiently meet their expectations. Quantity can also be looked at from the point of view of having equipment that is never used. From the literature reviewed, it can be concluded that both quantity and quality of input and output variables will determine successful implementation both aspects are incorporated in the appraisal of Indian cases studies in this research. A model for mapping the knowledge gained from the literature is given in Figure.
The model takes notice of models discussed in this chapter and other literature reviewed and has four characteristics. Firstly, it must help analyses the Indian situation, secondly, it must help to identify the various factors contributing to success and/or failure, and thirdly it needs to highlight the possibility of an action for success in response to situation specific issues. It must also help to identify other factors that may not have been highlighted by previous authors.

Input and output variables must be considered as far as they affect the success and failure of ICT implementation. Factors shown in Figure 2.5 were therefore used to evaluate ICT projects in India in this research. Qualitative tools were used to determine which factors have significant impact on ICT implementation and its success or failure. The research framework used takes cognizance of broad premises (benefits challenges and impact) of the Indian perspectives discussed Avgerou & Walsham (2000, p.2), Berleur & Drumm (2003) and Heeks (2002b) for both research and action. This is purposely intended to bring the relevant issues together and try to identify the necessary actions at this stage or research. Drivers (prerequisites) Factors for success Enablers (essentials) Input variables \( V \) Output variables Action for success
Identified gaps in the literature review

In this chapter, gaps in the literature have been identified which justify the need for this research. It is worth noting that literature on developed countries is not used in this research for a comparison between them and developing countries. Rather, it is used to identify good practices in ICT implementation.

This is especially true in regards to sufficiency of funds and other resources including infrastructure and human resources. The author of this thesis agrees with these observations and observes that there is little to compare between the two and that developing countries may approach ICT implementation differently from developed countries.

This was also observed during presentations and discussion at the 5th European Conference on E-Government, Academic Conferences (2005) the 2nd International Conference on E-Government, Academic Conferences (2006) and at a seminar on Governance in The Commonwealth: Civic Engagement and Democratic Accountability (Gichoya 2006b), at which the author of this thesis presented papers. From the presentations, it seems that developed countries are ahead and are more interested in diffusion and improvement in the components of e-government.

In developing countries, e-administration has to be successful before such areas like content, m-government and e-government in local authorities can be explored and focused on. However, it is worthy to note that literature on developed countries can be used to inform literature on developing countries to try to avoid re-inventing the wheel and to assist in "technology leapfrog".

An example would be methods suggested by Heeks (2000) for closing the design-actuality gaps, which gives insights on reducing failure associated issues. However, some suggestions given by Heeks may not apply in developing countries due to low levels of income, problems with consultants and issues related to leadership and attitude which are observed to be prevalent in developing countries.

2.17.1 Comments in the literature review

From the literature reviewed, there seems to be a number of different views and authors have focused on different variables that affect ICT implementation. This research attempts to bring together variables and cluster them under factors for success and factors for failure.
The factors for success are finisher clustered under drivers and enablers while factors for failure are clustered under barriers and inhibitors. This presents a clearer picture of the situation.

2.17.2 Lack of empirical case studies

Studies by authors quoted in this chapter show a lack of empirical case studies that can be used in theory building. With regard to e-government, Heeks (2003a) looked at case studies from the donor perspective and gave recommendations for donor actions. It can be argued that e-government cannot succeed if e-administration is not successful. Though most variables for e-government do apply to e-administration, there are specific variables for e-administration that are not general to e-government especially in developing countries.

The reason may be the broadness of e-government compared with e-administration. On related literature on ICT implementation, Wixom & Watson (2001) observe there are many studies that investigate the factors that affect the implementation of information systems.

However, they argue that while these studies are helpful, infrastructural studies are also necessary to provide a foundation for the present and future studies. The research reported in this thesis follows this direction by using case studies to identify the effects of various variables on ICT infrastructure implementation and subsequent success of e-administration rather than on factors such as usability or functionality.

2.17.3 Literature on developing countries

As mentioned in section 2.6, literature on e-administration in developing countries is deficient and as Heeks (2002b) observes, there is a need to carry our more studies to enrich it. Heeks blames the failure to find evidence on the magnitude of the problems with ICT in developing countries on the lack of literature in general, the lack of evaluation due to insufficient resources, and the focus on individual ISACT project case studies which taken alone provide no basis for assessment of the problem. From a review of the literature in this chapter and a consideration of the views expressed by
Heeks, it can be observed that there is little emphasis on some factors that are clearly crucial to implementation of e-administration in developing countries. There is also little evidence on proposed solutions to some of these problems, especially for solving situation specific problems. These factors are:” Financing of ICT projects from internal sources “Aligning ICT strategies with departmental, ministerial and national goals ”.

The political perspective on political influences on implementation " The individual perspective pronounced by the negative or positive attitudes of civil servants at all levels The corruption perspective which may affect staff recruitment, training and more crucially, procurement of ICT facilities e Transient constraints resulting from the donor perspective which may lead to unsustainable natures.

The issue of consultants which may depend on policies of individual movements the research reported in this thesis attempts to add to literature through carrying out case studies in a developing country with emphasis on variables, outcomes and solutions in India. The above issues are looked at critically in this research especially in relation to local improvisation and good practices. The research was carried out in the expectation that it would not only add to theory building but also offer practical solutions.

In order to put the gaps into perspective, Table 2.1 summarizes the gaps showing the nature of these gaps and their prevalence. Lack of empirical case studies e-administration projects Developing countries Literature on developing countries " Financing ICT projects e-administration projects Developing countries " ICT strategic alignment with organizational goals Literature, general ICT implementation Developing countries " Political perspective e-administration projects Any e-government project but more prevalent in developing nations " Individual perspective e-administration projects Developing countries 41 Corruption perspective e-administration projects Developing countries
Table 2.17.1: Gaps in the literature reviewed

<table>
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<tr>
<th>Gap</th>
<th>Nature of the gap</th>
<th>Prevalence</th>
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<td>Lack of empirical case studies</td>
<td>e-administration projects</td>
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<td>Financing ICT projects</td>
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<td>ICT strategic alignment with organizational goals</td>
<td>Literature, general ICT implementation</td>
<td>Developing countries</td>
</tr>
<tr>
<td>Political perspective</td>
<td>e-administration projects</td>
<td>Any e-government project but more prevalent in developing nations</td>
</tr>
<tr>
<td>Individual perspective</td>
<td>e-administration projects</td>
<td>Developing countries</td>
</tr>
<tr>
<td>Corruption perspective</td>
<td>e-administration projects</td>
<td>Developing countries</td>
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<tr>
<td>Donor perspective</td>
<td>e-administration projects</td>
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</tr>
<tr>
<td>Knowledge management</td>
<td>ICT projects</td>
<td>India</td>
</tr>
<tr>
<td>Consultant</td>
<td>e-administration project</td>
<td>India</td>
</tr>
<tr>
<td>Modelling</td>
<td>e-administration projects</td>
<td>Developing countries</td>
</tr>
<tr>
<td>Relationships between variables</td>
<td>e-administration projects</td>
<td>Developing countries</td>
</tr>
<tr>
<td>Recommendations and guidelines</td>
<td>e-administration projects</td>
<td>India</td>
</tr>
</tbody>
</table>

2.17.4 Modelling

From the observations in the literature, developing countries should adopt a different ICT implementation to those of developed countries. It then follows that models and frameworks that consider the situation in developing countries should be developed and this is one of the objectives of this research. Existing models and frameworks that are specific to developing countries are currently inadequate as observed from literature. However, some suggestions for good practices are published but mostly for developed countries. These models help in the understanding of the various issues identified in this thesis and this enriches the suggestions made in this research.
2.17.5 Relationships between variables

There is need to identify relationships between variables to note their effect on each other. This may also identify the independent variables. Studies showing the effect of one factor on another were not found to have been carried out in the literature reviewed.

During the process of finding solutions to various problems, it is necessary to understand how factors impact on each other in order to find a balance between them. This also helps the decision maker to have an idea about prioritization. This prioritization is especially important in developing countries there resources delimited.

2.17.6 Recommendations and guidelines

Some recommendations for ICT projects have been found in the literature by Heeks 2003a, Avgerou & Walsham 2000, Ndou 2004 and Chen et al 2006 among others quoted in this research. Though these recommendations are general for e-government, some like infrastructure and training are relevant to e-administration implementation in developing countries.

However guidelines on the implementation of these recommendations are lacking especially for the developing countries. This may leave implementers confused or wondering how a particular recommendation may be implemented. Guidelines point the implementers towards the necessary action to be taken.

2.18 Summary

This chapter has highlighted issues that the researcher felt affect ICT implementation in general and specifically in developing countries. The chapter has identified the need for ICT planning and the necessity to align it to organizational strategies. Specifically, the chapter has shown that the research questions, objectives and aims are valid.

The chapter provides a synopsis of ICT implementation in government. It has discussed ICT planning and implementation and shown the importance of planning in implementation. However, planning is not to be considered in isolation and the need to
align it with the organizational goals is emphasized. In this chapter, the initial expected benefits have been identified and defined as output variables. These together with the input variables are listed as factors for success or failure and been synthesized and put into broad categories.

This satisfies objective (1) of the initial objectives and research questions (1) and (2). An action for success was also elicited from the literature and a descriptive model is specified in Figure. This model helps in the identification and categorization of the variables while relating this to the action for success and the resultant output. This satisfies research questions (2) and (3) since it helps in the analysis and understanding of the problems.

It also acts as a preliminary step in the designing of a framework that can be used to evaluate ICT projects in India. The chapter has discussed ICT implementation in other countries that have successfully implemented similar projects.

This knowledge gives an idea about the good practices that could be emulated. By looking at the implementation practices in these countries, it becomes possible to determine differences between developed countries and developing countries as required in aim (1).

This would then mean developing countries can only borrow those practices that are applicable in their situation. An example would be the

Use of wireless technology for communication. This is a relatively new technology application that can help developing countries to leapfrog the wired infrastructure that is still underdeveloped in developing countries. In discussing the actions for success, the chapter responds to research question (1) and (2) and objective (4) which is to establish initial mechanisms for bridging the gap between success and failure.

The establishment of initial good practices from the literature indicates the criteria for establishing good practices used in India as specified in objective (5). In cooperation with developed countries, Palvia & Palvia (2003, p. 173) observes that "under-developed countries were driven by infrastructural needs rather than the
strategic or operational needs as the case was for developed countries”. In line with this observation, Palva and Palva (2003), recommended development of sound models, evaluating the predictive capability of such models, use of models for focused research, development of a comprehensive universal instrument and methodology to identify the key IS issues, and develop practical implications.

The model shown in Figure is used to inform the field research in terms of interview design and data analysis. This is used to determine whether similar factors are evident in India and whether other factors need to be considered. A final framework is then developed as a result of this research that identifies factors concerning the infrastructure that would be likely to lead to success of failure of ICT e-administration systems implementation.