Summary and Conclusion
The purpose of this study was to examine the growth sustainability of the Indian software industry in the light of the present export boom of the software service sector. This study tried to find out conditions under which the growth of software sector would sustain in future and in turn ensured the global supremacy of software industry.

In order to examine the growth sustainability, we first have looked at the theoretical issues of sustainable growth. The literature of growth theory within various frameworks has been discussed to find out long run growth sustainability conditions. Literature review reveals that the conditions of growth sustainability of an economy can be derived from New Growth Theory. To derive growth sustainability conditions at the industry level, an attempt has been made to use the Schumpeterian idea of firms' competitiveness and catching up theory (which is considered as the pillar of New Growth Theory). In catching up theory, we observed that the growth sustainability of an industry depends on the choice of high quality activities, which are knowledge intensive in nature to create competitive knowledge advantage. The industry level growth sustainability conditions therefore depend on the characteristics of high quality knowledge intensive activity. In the subsequent study, various issues of the Indian software industry were examined in the light of the conditions of growth sustainability derived from the theory.

After finding out the growth sustainability conditions, we tried to understand the software industry in common economic terminology. We felt that this was necessary for a better understanding of the software industry and also for deciphering the missing link between software and hardware segment of IT industry of India. We have elaborated uses, users, products and producers of software. This has helped us getting insights regarding critical technology, skill, value and risk in the process of software
development. While the Indian software ventures are generally categorized as low value/low skill activities, we have used the insight to locate the position of the Indian software industry in terms of product, producer and market category in the context of global software capability. We found that the presence of Indian software and services in high value/high skill segment is negligible although software industry is now worth billions of rupees. The services offered by Indian companies fall at the bottom of the value pyramid.

We argued that the embedded sector provides the missing link between the software and hardware of computing technology because successful development of embedded software needs matching computer hardware technology skill. Innovative application of microelectronics has revolutionized the manufacturing industry of the developed countries. Newly industrialized countries also followed the same path for building up competitive advantage through strategic application of microelectronic devices in their manufactured consumer goods. This is the area of embedded software that has to be coupled with hardware technology for innovative industrial applications.

We also showed that the embedded software segment holds the key to the supremacy in software market. We argued that embedded software is the critical segment that is closely linked with the manufacturing (capital and consumer goods) industry – the backbone of industrial strength of any country. Embedded software is the key to production efficiency through industrial automation and also essential element for developing products (capital and consumer goods) with intelligent, reliable and precision

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One such example is Taiwan. Joint effort of industry, government and research organization for creating semiconductor industry for industrial applications led to large number of product development and set up the growth path for industrialization of Taiwan [Chang et al 1993a, 1993b]
functions that can add high value and create competitive advantage. Perennially laggard in capital goods industry, the neglect of embedded software segment has pushed Indian capital goods sector further backward.

Lack of initiative in the embedded software sector has had a crippling effect on the Indian software industry. The conditions of the growth sustainability derived from the theoretical discussion however have helped us providing insights regarding the structure of the Indian software industry. While low barriers to entry, divisible investment, perfect competition, fragmented industry, very little technological progress etc. characterize the conditions of non-sustainable industrial growth, we have used the insight to scrutinize the status of the Indian software industry in the light of the above parameters.

We have argued that low value/low skill activities have created a structure of the Indian software industry that is quite similar to the other sector of the Indian industries characterized by its long tails. The basic dynamics of the industry is cost competition (mainly labor cost) and not competitive advantage based on knowledge creation. We have also noticed that the Indian software industry, due to its excessive dependence on external clients, has become a part of global software industry. Its growth is actually derived from the growth of global industry – it does not create its own growth. Being unable to move into the high skill segment of the industry due to lack of vibrant domestic market, long-term sustainability appears to depend on India’s ability to remain a low wage source of skilled manpower. We have argued that technological competitiveness not being the dynamics of such an industry, it is difficult to imagine that the industry would ever be able to find its own high skill/high value niche for long run growth sustainability unless there is any strategic intervention in this regard.
Policy initiative, however, primarily focused on maximizing export earning based on existing areas of activities by strengthening necessary administrative and technological infrastructure along with critical fiscal incentives. Most visible policy intervention so far from government of India and a few state governments has been in the form of setting up software technology parks (STPs). STPs with their modern infrastructure with other policy package might have helped increasing export earning in the existing types of products and services. What has been totally neglected is the critical technological capability part in the high value/high risk activities. For a long run consideration of software supremacy, IT has to be coupled with the domestic production system. This can create a formidable international supremacy in other industries as well. Only STP might be just trading the long-term benefit for short-term gains.

Although the structure of the Indian software industry is compatible with the low value/low skill activities, India has developed infrastructure for skilled manpower development over the last few decades to reap the gains from software boom. We have argued that nevertheless, the use of manpower is consistent with the industry dynamics.

We have investigated the availability of skilled manpower in India and their utilization in software sector as skilled workforce is one of the most important factors for competitiveness and sustainability of software industry. We have observed that despite of producing large pool of technically skilled manpower, high skill manpower is being used for low skill job in software sector due to increasing focus on low value/low skill/low risk activities done by the Indian software industry. Moreover, there is lack of availability of high value job.
The regressing analysis in this context has helped us getting insights regarding the source of inter firm differences of growth of Indian software firms. We have found an interesting result from the regression analysis. This has suggested that inter firm differences in the market share is not being explained by the level of productivity or degree of competition, but the number of manpower employed by the firm. The result has helped us to state that even if there is skill differentiation, the low skill job done by the Indian software firms standardizes the labor market. Or in other words, a homogeneous structure of labor market has emerged. We have also made an attempt to show graphically how high skilled manpower is substituted to do low skill job.

To further corroborate our central thesis, we have elaborated the value of capital investment in terms of venture capital in the Indian software industry. We have investigated how venture capital based financing assists the Indian software firms to grow by innovating new products in high technology areas (if at all exists). This has facilitated us getting insights regarding the meaning, characteristics and the use of venture capital in different stages of development cycle. We have also used the insight to scrutinize the dynamics of Indian existing venture capital industry and its role in domestic software technology development in the light of present engagement in low skill/low value activities.

We have shown that software firms are unable to undertake high-tech innovation or product development not only for their engagement in low skill/low value activities, but also due to virtual non-existence of social structure of innovation in the economy. Venture capital financed innovation, which overcomes financial, technological and organizational barriers and accelerates the process of technological change, might have
played a critical role here. However, in the Indian software industry, hardly any new
ideas or innovation has been observed that requires a different investment environment.
As a result, the dynamics of venture capital industry has emerged more or less as equity
investor as opposed to risky venture.

Earlier we have perceived that the embedded software segment holds the key to
technological competence of the software industry. We have also argued that embedded
software is closely linked with the capital goods sector and also with industrial
automation. This appears to be the most promising area for using and developing
software capability that has the potential to modernize our capital goods industry,
enhance industrial automation, create employment opportunity both in the resurgent
capital goods sector and the IT sector. It provides the greatest potential sector not only for
software supremacy but also for industrial supremacy. Venture capital has a very critical
role to play for new ideas and new innovations. Unless we enter into this area, the Indian
software industry will survive as long as it can remain its low manpower cost advantage.
This implies continuing low skill / low value / low risk activities, global supremacy of
Indian IT industry appears to be a distant dream. It would be too expensive to sacrifice
this scope for short term political or export gains.