

FOREWORD

1997 is an important year for one and all in Hong Kong and mainland China. On July 1 1997, sovereignty over Hong Kong was returned to China and Hong Kong became a Special Administrative Region (SAR) of China. Thus, the destinies of Hong Kong and China, which have long been closely linked, will become even more interdependent in the future.

Hong Kong's manufacturing industry has always been closely linked with the developments in and the manufacturing industry of China. The intertwining of the manufacturing industries of Hong Kong and China took a sharp upward turn in the mid-eighties when, owing to rising labor and land costs within Hong Kong, Hong Kong industrialists started moving their plant level operations into the Chinese mainland. Thus, by 1996, over 4 million people in the mainland were employed by Hong Kong manufacturers. At the same time, domestic employment by Hong Kong's manufacturing sector, which had stood at 24% of the total domestic employment at one time, had dwindled to a figure below 10%.

For China, this was a welcome development. Hong Kong had become a significant partner in the remarkable industrial growth experienced by China in the last decade. Hong Kong's strengths in terms of capital provision, knowledge of international markets, international connections, ability to react quickly to changing markets, understanding of how China works, manufacturing know-how, and the ability to significantly reduce manufacturing costs without compromising on quality are now viewed as important assets for the mainland too.

Within Hong Kong, however, the initial reaction was mixed. Notwithstanding the substantial growth in the total manufacturing output by Hong Kong manufacturers, a swing away from the manufacturing sector (towards the service sector which has also been performing extremely well) emerged in the public opinion. However, more recently, there has been a return to the realization that the presence of a strong manufacturing sector within the overall economy is essential for the long term stability of Hong Kong's economy. In particular, following an intensive study completed recently by MIT, the paradigm "Made *In* Hong Kong" is being replaced by that of "Made *By* Hong Kong".

The local paradigm shift towards "Made *By* Hong Kong" is actually a part of the worldwide paradigm shift towards globally distributed manufacturing or, simply, "Global Manufacturing". Enterprises, all over the world, both big and small, are now realizing that our world is indeed small. Technological developments in terms of transportation, telecommunications, Internet, etc. have made it possible for different components of the design and manufacturing cycle to be conducted at different locations distributed across the world. Meanwhile, the emerging view of the world as one single market, owing mainly to the decline in international tensions (the end of the "Cold War", etc.) and the rise of the Asia-Pacific region, has made it *necessary* to achieve globalization of manufacture. Finally, there is the growing hope that the global manufacturing era will lead to a more uniform distribution of the world's wealth.

A critical question to ask at this juncture is 'Do we have enough understanding of what is involved in distributed (globally) manufacturing in contrast to manufacture based on a single location?'. A review of world literature on this theme indicates that our answer to this question is, at best, sketchy. A great deal remains to be learnt regarding how to organize the cycle of design and manufacture, exploit fully the array of design and manufacturing technologies available, communicate design and manufacturing information across a network of distantly located 'nodes', and so on, in the emerging global manufacturing era. In short, globalization requires us to rediscover the science of manufacturing (to the extent it exists).

Returning now to the theme of 1997, it is clear that this year marks the beginning of a new era especially for the manufacturing industry spread across the mainland and Hong Kong. Following reunification, both the Hong Kong and mainland components can look forward to increased cooperation and even more dispersion of design and manufacturing activities. There is a need to periodically

exchange and document the experiences and the lessons learnt. The “Symposium on Advanced Design and Manufacture in the Global Manufacturing Era” was organized in Hong Kong with a view to providing such an opportunity for exchange of views amongst delegates from Hong Kong, mainland China, and the rest of the world.

This symposium has made 1997 an important year for Hong Kong’s academia and professionals related to manufacturing engineering for yet another reason. This symposium marks the first ever event in Hong Kong to be sponsored by CIRP (CIRP is the acronym, in French, for the internationally renowned ‘International Institution for Production Engineering Research’). The symposium is unique for a different reason too. It marks the first ever instance of joint organization of an international meeting by four institutions engaged in tertiary education in Hong Kong. In particular, The City University of Hong Kong (City U), The Hong Kong University (HKU), The Hong Kong University of Science and Technology (HKUST), and the Vocational Training Council (VTC) of Hong Kong have collaborated in organizing the symposium.

The present Proceedings partially document the intellectual exchanges at the symposium. They include ? papers from Hong Kong, ? from mainland China, ? from CIRP members, and ? papers from other international experts.

The topics addressed in the Proceedings cover a wide range. They range from specific ‘hard’ issues concerning the technologies that support the design and manufacturing processes to broad and ‘soft’ issues concerning the socio-political factors promoting or constraining the global distribution of manufacture. The keynote papers have been designed to provide specific, but complementary, views from global, national (China), and regional (Hong Kong) perspectives.

It is hoped that these Proceedings will, in general, lead to a deeper understanding of the design and manufacturing technologies needed in the emerging global manufacturing era. It is also hoped that the deliberations during the symposium will be of help to many scientists, teachers and professionals who are concerned with Manufacturing and Industrial Engineering in Hong Kong and mainland China in preparing for the challenges and opportunities facing them in the immediate post-1997 period.

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