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Commanding the Global Narrative in Engineering for Shared Prosperity of Humankind

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1.0 Sustainable Development Goals (SDGs)

The development agenda for the world is framed by the UN Post-2015 Development Agenda with its 17 SDGs and 169 Targets.

In my opinion, the achievement of the 17 SDGs by 2030 is beyond the resources of nearly all developing countries with the exception of China. The developing world is represented by the Group of 77 + China with its membership of some 135 countries. These countries should concentrate their limited resources in achieving SDG No. 1 "No Poverty". If their populations are not able to lift themselves out of poverty, their societies and nations have little hope of achieving the other 16 SGDs by 2030.

The outstanding example is China that has focused on poverty eradication first. With that being achievement lifting 800 million out of poverty in 2021, China and her society of moderate prosperity (小康社会) has been able to take care of all the attendant needs of her population like food and clothing as well as access to compulsory education, basic medical services, and safe housing even in the most remote and almost inaccessible rural regions. In the process China and her people has been improving their environment and protecting its flora and fauna.

China has in fact achieved the SDGs some 10 years ahead of 2030.

China is prepared to share her development achievement and experience with the developing world through South-South Cooperation.

2.0 China's Poverty Eradication Underpinned by Engineering and Technology

China's poverty eradication success has been anchored by the comprehensive and inclusive physical and virtual infrastructure that permeates the length and breadth of China. With such infrastructure, even the most remote community in China has become part of not only China's economy but also the supply chain of the World. There is an old Chinese saying often quoted by President Xi Jinping : "If you want to get rich, build road first" (要想富先修路).

Some world beating examples in science, engineering and technology in China's manufacturing and engineering construction are:
(i) Ever expanding network of high speed bullet train;
(ii) Ocean crossing bridges;
(iii) Multi-purpose water resource dams and reservoirs;
(iv) South-North Water Transfer project;
(v) Tunneling;
(vi) Broadband 5G network;
(vii) Super computers;
(viii) Aerospace development of rockets, spacecraft, rover on Mars and space station;
(ix) Modern airports;
(x) Modern; ports;
(xi) Ship building and transportation;
(xii) Rare earth industry;
(xiii) Solar photovoltaic, wind turbines and nuclear power reactor;
(xiv) Robots;
(xv) Drones;
(xvi) Electric cars and batteries.

The speed and efficiency of engineering construction is exemplified by the building of 2 Covid-19 hospitals in Wuhan in 10 days and that of engineering facility management is typified by the Beijing Winter Olympic Games in 2022.

It is China's modern and well-run infrastructure and smart manufacturing that has been the foundation of its economic and social achievement and will sustain China as the "factory of the world with Chinese characteristics" and "market of the world with Chinese characteristics".

3.0 The Belt and Road Initiative (BRI)

China has been sharing the fruits of her development success with the developing world through BRI. To me, the BRI is the platform for the developing world to lift their peoples out of poverty and become members of the shared community of prosperity for humankind.

Since President Xi announced the Belt and Road Initiative (BRI) in Kazakhstan in 2013, the physical and virtual infrastructure projects built by China to Chinese engineering standards abound throughout the developing world. The physical and virtual infrastructure projects outside China under the BRI are visible and outstanding installations throughout the world. Their contribution to social and economic uplift of the common citizens of the developing world is appreciated by the developing world.

The physical and virtual infrastructure assets built by Chinese engineers and engineering throughout the developing world is a success story that no Western governments and media can deny. What is even more striking is the announcement of the G7 Summit 2021 that they will compete with China's BRI by supporting the development of infrastructure in the developing countries. Thus, they acknowledge that BRI is a great success and worthy of their imitating. Indeed, imitation is the sincerest form of flattery! I believe their initiative is but an empty propaganda as the infrastructure assets in the developed countries of US and UK themselves are badly in need of repair and renovation. Both countries have for several decades depleted their engineering manufacturing industry in favour of investment in financial services for immediate financial gains. They will not be able to enhance their infrastructure assets at home without involving China as China controls the supply chain of essential engineering components of infrastructure construction.

Nothing symbolizes BRI better than the China-Europe freight rail service, replacing camels by trains. Since the first China-Europe freight train left southwest China's Chongqing in March 2011 much to the ridicule of the West, the service has reached more than 160 cities in 22 European countries. The China-Europe freight-train service has recorded more than 40,000 trips, with the transported goods valued at over 200 billion U.S. dollars. The trains made 12,406 trips in 2020. With the COVID-19 pandemic impeding sea and air transport, the China-Europe freight-train service has emerged as a reliable and economical choice in global logistics. It has truly been the lifeline for the landlocked nations of Central Asia, Eastern Europe and even Western Europe.

In ASEAN, the Pan Asian Railway project originally proposed by Malaysian Prime Minister Mahathir Mohamad has been given a great boost by the completion of the 1000km China-Laos high speed railway project in 2021.

4.0 Commanding the Global Engineering Narrative

Each of the above mentioned infrastructure projects and its contribution to poverty alleviation is a story that deserves to be told by China to the world.

According to President Xi Jinping, strengthening China's international communication is imperative as it will create a favourable external environment for China's reform, development and stability, as well as actively contributing to building a community with a shared future for humanity. President Xi urges efforts to develop a voice in international discourse that matches China's comprehensive national strength and international status, presenting a true, multi-dimensional and panoramic view of the country. President Xi states there is a wealth of vivid and evocative stories to be told. President Xi underscores a stronger team of capable Chinese professionals who can meet the requirements for international communication in the new era with strategies targeting audiences from different groups, countries and regions.

The most outstanding contribution to global poverty alleviation by China is her world beating accomplishments in all sectors of engineering from standard setting, design, manufacture, construction to operation and maintenance.

Engineering is both science and art. Engineering technological progress and innovation is driven by practical experiences in engineering projects on the ground. Thus most current and future engineering innovations will be by Chinese engineers as they design, manufacture, construct, operate and maintain projects in all engineering sectors throughout the developing world under the BRI. The Western engineering dons are teaching engineering of the 20th Century without much practical experience on the ground. They are not practising real engineering but on paper (纸上谈**兵**). It is ironical that in current world, they have carried out very few "Deed" yet they control the "Word" of global engineering! It is urgent for engineering leaders in China to command the global engineering narrative (发言权).

5.0 Recommendations

For China to command the global narrative in engineering, there must be a comprehensive strategy and action plan. I urge the Chinese Association for Science and Technology (CAST), the Chinese Academy of Engineering (CAE) and Tsinghua University to get together urgently to formulate such a strategy and action plan for the approval of the Chinese Government, the foundation of which must be the building of a comprehensive and inclusive engineering platform for the developing world under the BRI.

The following are my recommendations for consideration to be included in the engineering platform under BRI:

5.1 Accreditation of Engineering Courses in Chinese Universities

China should take urgent steps to get as many of the engineering courses in the 2500 odd universities in China to be accredited nationally to Chinese accreditation standard. This is the basic step to enable the engineering graduates of these universities, both Chinese and foreign, to work in all Belt and Road countries. China can help Belt and Road countries to set up their own national engineering accreditation systems, leading to the establishment of the BRI Engineers' Register for the mobility of registered engineers across all Belt and Road countries.

An good example is the ASEAN Engineers' Register of the ASEAN Federation of Engineering Organisations (AFEO) that is administered by the Institution of Engineers Malaysia (IEM) under the ASEAN Mutual Recognition Agreement (MRA) on Engineers.

5.2 Chinese Societies of Engineers to become International

Chinese Societies of Engineers should emulate the examples of the Institute of Electrical and Electronic Engineers (IEEE) USA or the Institution of Engineering and Technology (IET) UK to become BRI international engineering societies.

IEEE and IET are typical of US and UK institutions/societies of engineers of other major engineering disciplines like civil, mechanical and chemical engineering in having a global network of branches throughout the world. Their worldwide reach is based on foreign engineering graduates in US and UK universities forming the branches in their home countries. This

measure has been very effective in assuring the leading influence of US and UK engineering in the world.

I established the Malaysian IEEE Section and set up many IEEE Chapters in Malaysian universities. The Malaysian Section receives funding from IEEE Head Office in USA and the IEEE Chapters receive a complete set of IEEE publications like electrical codes, technical books, IEEE proceedings and transactions etc on token fee. I also set up the IEE (now IET) Malaysia Branch. IET provides funding for the Malaysian Branch. One of the most popular training programmes has been on the IEE Wiring Regulations for Buildings.

Both IEEE Malaysian Section and IEE Malaysia Branch organise international conferences in Malaysia with the Institution of Engineers Malaysia (IEM) with eminent UK engineers as keynote speakers.

I would urge that under BRI, the Chinese Societies of Engineers in the major disciplines of civil, chemical, electrical, electronic and mechanical engineering to become BRI international societies with an active international division staffed with engineers with foreign language skill, i.e. English, French, Spanish, German,and Russian.

All foreign engineering students in Chinese universities should be made student members of the respective Chinese Societies free of charge and arranged to be active in activities of the respective Societies in China. The Societies should maintain close connection with their graduate engineers and professional engineers who have returned to their home countries with the objective of establishing branches in those countries.

Such foreign branches can be quickly set up inside the national institutions of engineers in Belt and Road countries. They can organise conferences, seminars and site visits on engineering projects in China and in foreign countries to promote deeper understanding of BRI and China's development strategy of infrastructure based poverty alleviation .

With help from China and the Chinese contracting corporations active in the countries, they can organise TVET training programmes for their engineers and technicians to provide appropriate skills to improve their employment prospect as per Chinese proverb "teaching one to fish rather than giving him fish" (授人以鱼不如授人以渔).

In my experience, all national institutions of engineers in Belt and Road countries are eager to learn from China about the latest engineering and technology in the design, construction, operation and maintenance of infrastructure assets that are increasingly being impacted by digital technologies like automation, robotics, AI, IoT, 5G etc.

I would hasten to add that the benefit is not one-sided. Chinese engineers can also learn a great deal about the foreign countries in their interaction with their foreign counterparts as knowledge of local conditions, culture and indigenous project participation are important to assure the sustainability of BRI.

I consider having friendly sister institutions of engineers to promote Chinese engineering is an important way to get the Chinese engineering narrative across the world.

5.3 Translation of Chinese Engineering Publications

China should cause to compile the important Chinese engineering textbooks, project manuals, engineering standards and engineering books about engineering projects under BRI at home and abroad and make them freely available worldwide and accepted through conferences, symposia, exhibitions and project site visits etc.

I remember how important to my own engineering education was the availability of low cost Asian edition of engineering books by McGraw Hill and John Wiley of USA.

Some examples of English language books in my possession are (i) “Jewels in China’s Crown” about China’s achievements in aerospace, high speed rail, bridges and supercomputers; (ii) “Managing Water Resources for People’s Livelihood and Sustainable Development” by former Minister of Water Resources Chen Lei and (iii) “Yuan Longping, the Man who Saves the World from Hunger”. There are many videos about outstanding Chinese engineering projects in English such as in the Big Story series of CGTN. The CCTV Chinese series on Mega Engineering Projects in China should have English and other foreign language commentary. I have watched programs of BRI projects in all continents in Phoenix TV’s series “Dragon Across the World” (龙行天下). Alas they are in Chinese! There must be many more that should be collated and translated into English and other major foreign languages.

The Chinese have been masters of record keeping and archival throughout the ages with historical records of emperors and dynasties, of provinces and cities right down to family histories. Bookshops in China and in engineering ministries are full of engineering books of all description in Chinese. With modern computer hardware and software, translation of appropriate engineering books into foreign languages should present little or no problem to the Chinese.

5.4 Belt and Road Federation of Engineering Organisations (BRFEO)

I would urge China to establish the Belt and Road Federation of Engineering Organisations (BRFEO) as an international member of the World Federation of Engineering Organisations (WFEO) with head office in Beijing that is equipped with sufficient resources to enhance Chinese engineering as the global voice of engineering not only in the developing world but also in the developed world.

BRFEO will present the views of the developing world in engineering infrastructure as the foundation of common prosperity of humankind to the United Nations in New York and its specialised agencies like UNESCO in Paris.