EXECUTIVE SUMMARY BY TAN SRI VC

The University of Malaya High Impact Research (UM HIR) Programme started in August 2011 with a grant of RM590 million from the Ministry of Higher Education (MOHE). The primary objective was to conduct cutting edge fundamental research which can result in ISI/WoS Tier 1 publications, including in Nature and Science journals. Over 180 projects were supported in disciplines like medicine, science, dentistry, engineering, computer science and arts, social science and humanities, with the promise of 3,400 Tier 1 publications. To ensure its success, HIR was placed directly as a special project under the Chancellory, thus avoiding having to go through many bureaucratic processes to ensure speed and efficiency. Continuous roadshows had to be held to promote HIR and to encourage researchers to take the plunge and accept the challenge to conduct world-class research.

PUBLICATIONS

To date, 3,623 Tier 1 publications have been achieved against a set target of 3,400. Many of the publications appear in top journals with high citations such as Chemical Reviews, The Lancet, Nature Reviews Cancer, Science, Chemical Society Reviews, Nature Genetics, Nature Medicine and Nature Oncology. Thirty publications were in journals ranked in the top 1% of their respective disciplines, 43 publications in journals ranked within the top 10%, and 60 publications in Nature Scientific Reports. More than 500 articles have been submitted to Tier 1 journals for consideration. Besides publishing in ISI Tier 1 journals, researchers have published 914 articles in journals that are non Tier 1 ISI/WoS journals, 474 in Tier 2, 294 in Tier 3 and 146 in Tier 4. In addition, 199 articles were published in non-ISI journals acknowledging HIR funding. The Faculty of Engineering, the Faculty of Computer Science & Information Technology and the Faculty of Science have surpassed their targets, scoring 149.2%, 255.2% and 101.4% respectively whereas projects under the Chancellory flagship programme as well as the Faculty of Medicine have exceeded 80% of their set targets.

MANAGEMENT

In order to achieve the HIR targets, a new set of governance was introduced for this special research programme placed under the Chancellory. A HIR International Advisory Council was formed consisting of 4 Nobel Laureates and 2 world-renowned distinguished scientists to advise us on cutting edge research. The HIR Committee was set up chaired by the Vice Chancellor to handle the conduct of the programme assisted by a dedicated Central HIR Secretariat, aided by HIR secretariats at the faculty level. The Ministry of Higher Education sent teams of auditors consisting of senior professors and researchers once every 6 months to monitor the progress of each funded project. The audit process was diligent and stringent and great attention was given to the comments and recommendations of the audit teams, with the appropriate actions being taken, including the termination of 8 projects. Additional audits from MOHE and from UM were conducted to ensure proper financial management and the acquisition of equipment which must conform to government standing orders.

FINANCE

Of the allocation of RM590 million for the 5-year HIR programme, a total of RM548 million was spent, with RM354 million under operating expenditure and RM194 for capital expenditure. Under the operating budget, the highest expenditure was for the purchase of consumables, accounting for 40% of the total operating budget. This was followed by the payment of salary for Research Assistants and HIR Post-Docs at 39%. Under the capital budget, about 50% was spent on the purchase of high end equipment to set up a central core facility in the HIR Building while the rest was spent at the faculty level to purchase equipment.

One of the more successful innovative management system was the introduction of the topping up grant for projects which have met their publication KPIs ahead of time. The fund comes from prudent expenditure as well as from money recovered from projects which have been terminated following the recommendation of MOHE Auditors. About RM29 million was used for this exercise which resulted in the further publication of 459 Tier 1 ISI papers.

OTHER ACHIEVEMENTS

The achievement of the HIR programme can be measured by its many successes in many areas. Although HIR promised to deliver 3,400 Tier 1 ISI/WoS publication during this 5 year period, we have managed to exceed this target and actually delivered 3,623 (106.6%). What is more impressive is the quality of the publications.
HUMAN CAPITAL DEVELOPMENT
HIR aimed to help Malaysia elevate its status to a developed nation by 2020 through its human capital development. Many developed countries spend at least 4% of their gross domestic product (GDP) on R&D whereas Malaysia spends only about 1%. The lack of adequate R&D funding, plus inadequate career structure and low wages, are some of the major obstacles to the advancement of scientific R&D and manpower development. Nevertheless, through the HIR programme, 3,065 persons were employed to assist in research projects although not all of them stayed for the full year. The highest number was 1,042 full-time RAs with a basic degree of which 864 were local graduates, followed by 807 RAs with a Master degree, 496 RAs who registered for the Master degree and 686 for the PhD degree. One of the problems encountered was the recruitment of local graduates to undertake research due to the poor career structure.

ACADEMIC ICONS
The purpose of the HIR Icon Programme is to appoint world renowned scientists from around the world to collaborate with our researchers in their respective projects. The support of these icons is invaluable as they can share their expertise with our academic staff and thus enhance the research reputation of UM through such international world class connections. For the period of August 2011-June 2016, UM managed to appoint 198 HIR Icons against a target of 183 icons.

The networking with international scientists, world class universities and institutions have been most successful and rewarding. Besides the 6 members in the HIR Advisory Council, HIR has managed to connect their research with many international collaborators. Participating in large consortium research is one way of ensuring publications in top journals as exemplified in the consortium study on breast cancer.

INTELLECTUAL PROPERTY RIGHTS
Although the emphasis of HIR is on fundamental research leading to better publications and citations, one of its KPIs promised was on intellectual property rights (IPR) such as patents, trademarks, copy rights, etc. From August 2011 to June 2016, HIR has achieved 297 out of 513 IPR targeted (57.9%), including 42 patents granted, 199 fled. In addition, there were 28 trademarks, 22 copyrights and 1 industrial design. Three spin-off companies have resulted from such HIR funded projects.

AWARDS
Several researchers under the HIR Programme have received prestigious awards based on the outcome of their research output and contributions. It just shows that with adequate funding, it is possible that, in the not too distant future, Malaysia may be able to win many more such awards, including the Nobel Prize.

IMPACT TO SOCIETY
It is gratifying to note that many of the research outcome not only resulted in producing publications in top journals but also have an impact to society. In the book “Touching Lives, Impacting Society” published by HIR in 2014, it showcased the success of HIR through the lives which have been touched and the nation transformed due to the tireless pursuits of the HIR researchers. From spinoff companies, patents and consultancies, this has an economic impact to the country which will continue to bear fruits in the years to come. Many of the outcomes from health-related research have already touched lives and made a difference in patient management and community health at large.

CORE FACILITY
The setting up of the core facility in the HIR Building was a good decision but proved to be a colossal task. The HIR Committee experienced considerable delay in the purchase of critical equipment due to the strict compliance of government procedures. Despite these obstacles and challenges, the core research facilities became operational within a year and have now become a full-fledged successful entity. The core facility instruments are of the latest models, and included some which were unavailable anywhere else in the Southeast Asian region. The central HIR high-end equipment transformed the research landscape in UM, resulting in high impact research activities in genomics, proteomics, metabolomics, analytical chemistry, cancer research, and clinical research, and are made freely available to all UM researchers through a convenient online booking system. The facility managed to attract researchers from all the four research universities in the country (UKM, USM, UTM, UPMS) as well as several public and private universities, not to mention ivy-league universities the world over. The HIR Research Business Unit based its technical service on this facility. It now takes pride of place in UM and serves as a valuable asset to the nation.

CONCLUSION
HIR has been a resounding success by all accounts and showed the country that it is possible for a local research university to embark on world-class research if given adequate financial support and flexibility. It has changed the research culture of UM in a mere 5 years and this has made a tremendous difference to the staff and students in the university. The ranking of UM has soared in the past few years, contributed in part by the change in research culture through HIR. This final report to MOHE is a testament of the dedication and hard work of our university staff and students, with the strong support of all strata within the university framework of management. The goal attained is proof that with adequate financial support and strong commitment, it is possible for Malaysia to compete with the very best universities in the world.

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Tan Sri Prof. Dr. Mohd Amin Jalaludin
Vice Chancellor

Softcopy of UM HIR Final Report can be accessed through the link below:-