

CELEBRATING  
COMMERCIALISATION  
YEAR 2014

# iiindex 2014

AN INTERNATIONAL EXPOSITION ON RESEARCH AND INNOVATION

invention  
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& design  
exposition 2014

INNOVATEUR  
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2014

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UNIVERSITI TEKNOLOGI MARA  
MALAYSIA

*Bridging  
the valley of death :  
advancing the  
commercialisation  
of research*

RESEARCH BOOK

# iiindex2014

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innovation  
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## FOREWORD

The Honourable Minister of Science, Technology and Innovation (MOSTI) has launched 2014 as Malaysia Commercialisation Year 2014 (MCY2014) with the theme Science Technology and Innovation (STI) for Wealth Creation. In line with this theme, Invention, Innovation, Design & Exposition 2014 (iidex2014) is an annual exposition organized by UiTM and is the ultimate platform to highlight and commercialise new inventions and innovations. Researchers and inventors will exhibit their products which cater to the needs and wants of the community and the country.

The iidex2014 creates a new dimension by fusing two competitive concepts, a competition among innovative products and a competition to invite Innovateur Wannabes to perform live pitching of their products to the audience. The iidex2014 focuses on comprehensive commercialization and creating opportunities for entrepreneurs to carry out R&D as well as to provide avenue to commercialise their products. Through expositions such as iidex2014, MOSTI hopes to inculcate the culture of commercialisation of new technology designed and created by Malaysians.

I wish to congratulate all the participants of the iidex2014 and this is the opportunity for all researchers to show their ideas and exhibits their products and creativity. Apart from showcasing their products, innovators will have the opportunity to provide a window to the industry for business matching during the exposition.

Tan Sri Dato' Sri Sallehuddin Mohamed  
Pro-Chancellor, Universiti Teknologi MARA

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## MULTI-ANGLE LADDER (MAL)

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There are various type of ladders in the market but every single unit has its own uses and purposes. Ladder has a big role especially for domestic use even though there are many invented tools to replace the purpose of a ladder. Using a safe, ergonomics and appropriate ladder for specific use is crucial due to the importance of ladder related-safety precautions, whether it is for domestic or industrial usage. Painful and incapacitating injuries can happen if user takes ladder safety for granted even though it is a low ladder accident. Multi-Angle Ladder (MAL) is a versatile modular ladder system suitable for home, office, factory and heavy industry environment. It is an innovation with multi-angle steps that enables multi-functions and purposes plus extremely high in stability. Multi-angle ladder is designed to fit certain designated criteria of users and needs. The design is in a single unit measured 180 cm length and 50 cm width that can be used as a straight ladder, step ladder, single ladder, offset ladder and a practical ramp. A straight ladder is a position that allow the ladder to be leaned against the wall or can be mounted as a permanent step or ladder for an upright climbing. Step ladder is used when the ladder is placed or leaned against the wall or between any split level. Reinforced rungs can be adjustable to suits the desired angle or degree. Auto-lock system works when the rubber arm is adjusted according to the angle. Another useful and practical position is the ramp that will benefit users with wheels such as trolleys, strollers and wheelchairs. The rungs can be transformed as ramp when it is angled at 0 degree level for east access. The multi-angle ladder also works as a multi-function and multi-purpose ladder when each single unit is combined together and can be transform into a platform or scaffold position, an extending ladder, a two-man use and also a conveyer to transfer goods. The characteristic of an aluminium is the best material for the product with secured rubberize wrapped at every corner and angle for better protection, gripped and safety. it is also remarkable for the metal's low density plus the extrusion processs of aluminium best fit the criteria of parts in the material processes. Aluminium is theoretically 100% recycleable without any loss of its natural qualities. It is a popular material for ladders because of its strength, durability, lightweight, affordable and appropriate for mass production. The uniqueness and versatility of this product it has reinforced rungs that can be adjustable to different angle or degree such as from 0 degree to 270 degree and will be automatically lock when the rungs changes its angle. The concept of the design is from a window shutter that normally found in residents for a variety of reasons. Shutters can be configured in a single tier unit that has one shutter top to bottom of a window opening as well as multiple tiers. This multi -angle ladder is durable, stable and practical appropriate for everyday use or for emergency purposes. Another added value is that it is compact and standard in sizes so it can be folds flat and stackable on top of another for easy storage, packaging and transporting