



UNIVERSITI PUTRA MALAYSIA

***EVALUATING THE USE OF BUILDING INFORMATION MODELLING
IN RESORT DEVELOPMENT IN REBUBLIC OF THE MALDIVES***

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**EVALUATING THE USE OF BUILDING INFORMATION MODELLING
IN RESORT DEVELOPMENT IN REBUBLIC OF THE MALDIVES**

By

AHMED THOLHATH

**Thesis Submitted to the School of Graduate Studies, Universiti
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Master of Science in Architectural Studies**

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DEDICATION

To my beloved father

Mr. Ismail Moosa.

He is my inspiration to reach my aspirations.

Walking me through the journey of life

And taking me to safe destinations,

He opened my eyes to see beyond sight.

Contentment of success

Conspicuously appending

With eternity & affection.

Abstract of thesis presented to the Senate of Universiti Putra Malaysia in fulfillment of the requirement for the degree of Master of Science

EVALUATING THE USE OF BUILDING INFORMATION MODELLING IN RESORT DEVELOPMENT IN REBUPLIC OF THE MALDIVES

By

AHMED THOLHATH

February 2013

Chair: Professor Rahinah Bt. Ibrahim, PhD

Faculty: Design and Architecture

Ineffective collaboration within project participants during building process is causing poor implementation coordination for sustainable development of resort projects in Maldives. Concept design, detail design, construction and the facility management are separate stages of project awarded to different firms for their implementation. These need to be collaborated during project lifecycle. Attainment of quality and productivity in the construction industry has long been a problem in Maldives.

A case study consisting of two similar resort projects with the same bed capacity and star rating within the Ari atoll (Maldives) was undertaken for the purpose of study. The problems of managing concerns of implementation coordination and technological integration in developing sustainable resort projects in the Maldives were evaluated. Utilization of

Building Information Modelling (BIM) for implementation coordination during building process in Maldives and the implications on two selected projects were evaluated.

The study have identified eleven conditions—planning errors, design errors, amendments due to design errors, misinterpretation of drawings, use of 3D models, discontinuation of information, construction practicality, onsite errors, use of prefabrication, amendments due to construction errors and time extensions for construction—from both case projects that are related to their increasing of quality and productivity while decreasing cost and duration phenomenon. The study found careful contractual and procurement method must could accomplish project objectives. The study recommends BIM for improving implementation coordination which could increase construction productivity and prefabrication with less rework on site. Better coordination to minimize errors in design, construction and management of the projects with BIM accounts for the improvement to the project lifecycle of the project to build a sustainable and eco-friendly construction industry.

Sustainable development can significantly reduce adverse human impacts on the natural environment while simultaneously improving quality of life and economic well-being. Therefore the construction industry needs to integrate BIM for the successful implementation of construction projects towards sustainable development. Effective collaboration will improve implementation coordination and integration through BIM during building

process with innovative planning in the Maldives, hence improve construction industry and develop sustainable resort projects. Achieving sustainability through coordination and integration by BIM and identifying relationship between ecological and socio-economic systems will be the main contribution to the construction industry in Maldives.

Keywords: BIM, Implementation coordination, Sustainable development, Construction



Abstrak tesis yang dikemukakan kepada Senat Universiti Putra Malaysia sebagai memenuhi keperluan untuk ijazah Sarjana Sains

PENGUNAAN BIM UNTUK PELAKSANAAN PEMBANGUNAN PUSAT PERANGINAN MAMPAN DI REPUBLIK MALDIVES

Oleh

AHMED THOLHATH

February 2013

Pengerusi: Profesor Rahinah Bt. Ibrahim, PhD

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Kolaborasi yang tidak efektif dalam kalangan ahli projek semasa proses pembinaan menyebabkan kordinasi implementasi yang lemah untuk pembangunan mampan pusat-pusat peranginan di Maldives. Konsep reka bentuk, perincian reka bentuk, pembinaan dan pengurusan fasiliti adalah fasa-fasa berlainan sesebuah projek yang mana firma-firma berlainan akan dilantik untuk melaksanakannya. Kesemuanya memerlukan kolaborasi yang baik di sepanjang kitaran hayat projek. Dapatan kualiti dan produktiviti di dalam industri pembinaan sememangnya suatu permasalahan di Maldives.

Sebuah kajian kes mengandungi dua projek pusat peranginan yang sama kapasiti katil dan penarafan bintang di Atoll Ari, Maldives dijalankan dalam kajian ini. Permasalahan pengurusan membabitkan kordinasi

implementasi dan integrasi berteknologi di dalam pembangunan projek-projek pusat peranginan di Maldives telah dikaji. Penggunaan Permodelan Informasi Bangunan (BIM) untuk kordinasi implementasi semasa proses pembinaan di Maldives dan implikasi ke atas dua projek terpilih untuk dinilai.

Kajian ini telah mengenalpasti sebelas kondisi—kesilapan merancang, kesilapan mereka bentuk, pembetulan kerana kesilapan mereka bentuk, kesilapan mengintepretasi dokumen lukisan, penggunaan model 3D, ketidaksambungan maklumat, praktis pembinaan, kesilapan di tapak, penggunaan fabrikasi, pembetulan kerana kesilapan pembinaan dan penambahan waktu binaan—dari kedua projek kes yang berkaitan dengan fenomena peningkatan kualiti dan produktiviti yang mengurangkan kos dan waktu. Kajian mendapati bahawa kaedah pengkontrakan dan perolehan yang dirancang dengan teliti mampu mencapai objektif projek. Kajian mencadangkan BIM untuk mempertingkatkan kordinasi implementasi yang mampu meningkatkan produktiviti dan fabrikasi dengan pengurangan kerja ulangan di tapak. Kordinasi yang baik untuk mengurangkan kesilapan dalam mereka bentuk, pembinaan dan pengurusan projek melalui penggunaan BIM dijangka mempertingkatkan kitaran jangka hayat projek untuk membina sebuah industri pembinaan yang mampan lagi mesra alam.

Pembangunan mampan boleh mengurangkan secara signifikan kesan impak manusia ke atas persekitaran semula jadi yang selari dengan

penambahbaikan kualiti kehidupan dan kesejahteraan ekonomi. Oleh itu, industri pembinaan perlu mengimplementasi BIM untuk memacu implementasi projek pembinaan ke arah pembangunan mampan. Kolaborasi efektif boleh menambahbaik kordinasi implementasi melalui penggunaan BIM semasa proses pembinaan dengan perancangan yang inovatif di Maldives, justeru melonjakkan industri pembinaan dan membangunkan projek peranginan mampan. Pencapaian kemampanan melalui kordinasi dan integrasi oleh BIM dan mengenal pasti hubungan di antara sistem-sistem ekologi dan sosio-ekonomi akan memberikan sumbangan utama kepada industri pembinaan di Maldives.

Kata kunci: BIM, Kordinasi Implementasi, Pembangunan Mampan, Pembinaan

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I certify that a Thesis Examination Committee has met on **27 February 2013** to conduct the final examination of Ahmed Tholhath on his thesis entitled “Evaluating the use of Building Information Modelling in resort development in the Republic of Maldives” in accordance with the Universities and University Colleges Act 1971 and the Constitution of the University Putra Malaysia [P.U.(A) 106] 15 March 1998. The committee recommends that the student be awarded the Master Science.

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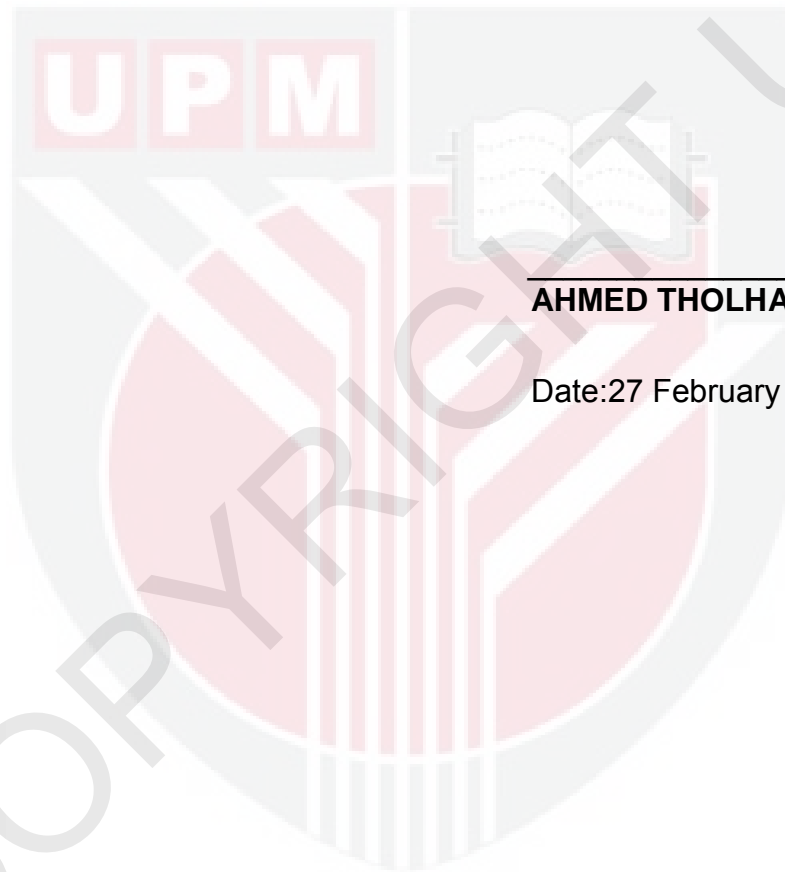
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DECLARATION

I declare that this is my original work except for quotation and citations which have been duly acknowledged. I also declare that it has not been previously, and is not concurrently, submitted for any other degree at Universiti Putra Malaysia or at any other institution.



AHMED THOLHATH

Date:27 February 2013

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