

Building Information Modeling (BIM) and other Information Technology (IT) Solutions in Construction Industry

Market Research

September 2003



This document contains confidential and proprietary information belonging exclusively to Eldanel. It does not imply an offering of securities. The person, company and/or entity in possession of this document and/or its agents and/or its affiliates hereby covenants and agrees to review and use the information solely for the purpose of evaluating and/or pursuing business opportunities with Eldanel and may not knowingly publicize, permit, authorize or instigate disclosure of terms, strategies, or other contents of this market research to any person, firm, organization or entity of any type outside the scope of evaluation.

Preface

Eldanel – Business Solutions & Services (hereafter “Eldanel”) was requested by Ziggurat Company to prepare a market research for its future operations.

The market research is submitted for exclusive use by Ziggurat and may not be quoted in any document other than by Ziggurat or without prior authorization from Ziggurat. The market research is confidential and may not be forwarded to a third party without prior authorization from Ziggurat and Eldanel.

The market research is based on data from various publications, studies, and articles researched by Eldanel in addition to information received from Ziggurat. Eldanel may not be held responsible for the validity of any data, forecasts, and/or estimates provided herein.

This document is a trade secret and its confidentiality will be strictly maintained. Use of the copyright notice does not designate publication.

Copyright © 2003 by Eldanel – Business Solutions & Services. All rights reserved

Table of Contents

1. <u>Executive Summary</u>	5
2. <u>Introduction to Methodology</u>	10
3. <u>Problem Statement</u>	13
3.1. <i>General methodology of Market Research Analysis for Markets of Technological Products</i>	13
3.2. <i>Preliminary Description of Project Management in Construction according to the stages of the project's life cycle</i>	14
3.3. <i>Existing Integration Problems of Project Management in Construction</i>	15
3.4. <i>History Analysis of Existing IT Solutions in Construction</i>	16
3.5. <i>Main Aspects of IT (PLM/AECO) Solutions in Construction</i>	18
3.5.1. <i>Effect caused by Existing Solutions and Directions and tendencies of their Improvement</i>	19
3.5.2. <i>Technology Solutions' Characteristics</i>	21
3.5.2.1. <i>Major BIM Solution Suppliers (Autodesk, Bentley, Graphisoft)</i>	25
3.5.2.2. <i>Other BIM Solutions Suppliers</i>	32
3.5.3. <i>Comparative Model of Major BIM Solutions</i>	37
3.6. <i>Main Advantages of BIM implementation in the IT Market</i>	40
3.7. <i>Future Tendencies of the Market- Visions and strategies</i>	40
3.7.1. <i>Transition to a building information model problems</i>	41
3.7.2. <i>Future of Product Modeling and Interoperability</i>	41
3.7.3. <i>Scenarios of how business environments might look in the future</i>	43
4. <u>Market Analysis of Existing Project Management Program Solutions in Construction</u>	52
4.1. <i>Market Environment</i>	52
4.1.1. <i>General PLM Analysis (Products, Market Overview and Forecast)</i>	52
4.1.2. <i>Usage of CAD across Different Applications</i>	57
4.1.3. <i>Geographical Markets of Construction Industry</i>	58
4.2. <i>BIM Application Fields</i>	62
4.2.1. <i>Problems Solved by BIM in Different Industrial Fields</i>	62
4.2.2. <i>General Application ranges</i>	63
4.2.3. <i>Success Stories</i>	64
4.2.3.1. <i>General</i>	64
4.2.3.2. <i>Institutional – Hospitals</i>	69

<i>Science Centers</i>	71
4.2.3.3. <i>Institutional Non-Building – Roads</i>	71
4.2.3.4. <i>Non-residential Commercial –Hotels</i>	72
<i>Industrial</i>	73
4.2.3.5 <i>Residential</i>	74
4.2.3.6. <i>Public Utilities - Stadium</i>	74
4.3. <i>Analysis of Competition on the Market</i>	76
4.3.1. <i>Market Participants</i>	76
4.3.1.1. <i>Key-Players</i>	77
4.3.1.2. <i>Other Market Participants</i>	90
4.3.1.3. <i>Major players</i>	97
4.3.2. <i>Comparative analysis of major players’ business models</i>	98
4.3.3. <i>Pricing Policy</i>	100
4.3.4. <i>Strategic Aliances</i>	101
<u>5. <i>Conclusions, recommendations and selection of main directions for the future company development</i></u>	105
5.1. <i>Conclusions</i>	107
5.2. <i>Recommendations</i>	108
<u>6. <i>References</i></u>	110
<u>7. <i>Appendices</i></u>	112
7.1. <i>Construction IT International organizations</i>	112
7.2. <i>Market Participants</i>	113