

Biometrics and Smart Cards

Table of Contents

CONFIDENTIAL Copyright © 2003 International Biometric Group

International·Biometric·Group

R e s e a r c h C o n s u l t i n g I n t e g r a t i o n

International Biometric Group Biometric Research Report Series

Copyright © 2003 by International Biometric Group. All rights reserved.

Duplication or reproduction of this publication in any form without prior written permission is forbidden. The information contained herein has been obtained from sources believed to be reliable. International Biometric Group disclaims all warranties as to the accuracy, completeness or adequacy of such information. International Biometric Group shall have no liability for errors, omissions or inadequacies in the information contained herein or for interpretations thereof. The reader assumes sole responsibility for the selection of these materials to achieve its intended results. The opinions expressed herein are subject to change without notice. All third party company names, product names and marks are used for identification purposes only and may be trademarks of their respective owners.

Request for permission or further information should be addressed to:

International Biometric Group
One Battery Park Plaza
New York, NY 10004
(212) 809-9491

Table of Contents

Executive Summary	1
Biometrically-Enabled Smart Cards: An Overview	4
Landscape Of Marketplace	5
Global Market	5
Biometrically-Enabled Smart Card Revenues and Total Biometric Revenues	5
Breakdown of Biometrically-Enabled Smart Card Revenues	6
Biometric Technologies in Smart Card Applications	7
Revenue Trends by Biometric Technology	7
Differentiating Factors for Biometrics in Smart Card Applications	8
Comparative Technology Assessment for Biometrically-Enabled Smart Cards	9
Leading Applications	10
Revenue Trends by Biometric Application	10
Comparative Applications Assessment for Biometrically-Enabled Smart Cards	12
Key Technology Providers	14
Platforms for Biometrically-Enabled Usage	14
Role of Leading Smart Card Solution Providers	14
Middleware	16
Biometric Peripherals and Sensors	16
Typical Deployments: A Comparative Overview	17
Contact vs. Contactless Technologies	18
Biometric and Contactless Technology Drivers	18
Biometric and Contactless Technology Inhibitors	18
System Architecture: Storage And Matching	20
Biometric Functionality Alternatives	20
Storage Considerations: Template Size	23
On-Card Acquisition	26
Interoperability and Standards	28
Smart Card Interoperability and Standards	28
Biometric Standards	28
Biometric Interoperability: Challenges and Approaches	30
System Security: Cryptographic Functionality	33
Secure Access Modules	33
Card Issuance Alternatives	35

Table of Figures

Figure 1: Global Revenues Attributable to Biometric HW/SW/Integration in Smart Card Programs (\$m USD).....	5
Figure 2: Biometric Revenues in Smart Card Programs vs. Total Biometric Revenues (Non-AFIS) (\$m USD)	6
Figure 3: Integration, Hardware, and Software Revenues (\$m USD)	6
Figure 4: Annual Revenues by Biometric Technology in Smart Cards Programs/Systems (\$m USD).....	7
Figure 5: Growth by Biometric Technology in Smart Cards Programs/Systems (\$m USD).....	7
Figure 6: Synergies and Challenges For Biometrics in Smart Card Applications	9
Figure 7: Growth by Application in Biometrically-Enabled Smart Card Programs/Systems (\$m USD).....	10
Figure 8: Percentage of Revenues by Application in Biometrically-Enabled Smart Card Programs/Systems (\$m USD)	10
Figure 9: Annual Revenues by Application in Biometrically-Enabled Smart Card Programs/Systems (\$m USD).....	11
Figure 10: Biometrically-Enabled Smart Card Applications – Technologies, Storage, and Matching Alternatives.....	13
Figure 11: Java Card and MULTOS	15
Figure 12: Typical Biometrically-Enabled Smart Card Deployments	17
Figure 13: Storage, Matching, and Acquisition Locations	20
Figure 14: Biometric Functionality Alternatives	20
Figure 15: Biometric Data Storage Alternatives	21
Figure 16: Card-Based vs. Central Storage.....	21
Figure 17: Template and Compressed Image Storage Requirements	23
Figure 18: Biometric Data Matching and Transmission Alternatives	24
Figure 19: Card Issuance Alternatives.....	35