

Contents

CHAPTER 1	
EXECUTIVE SUMMARY	1
A new era for mobile device vendors	1
Revenue growth from handset sales is no longer sustainable	1
Why mobile content and widgets are so important to OEMs	2
Changes in the value chain pushing operators to new strategies	4
The failure of the walled-garden model and its consequences	4
Why widgets are important to operators	5
Internet user experience: mobile vs. desktop	7
Widget evolution and trends	9
Widget's role in context-based applications and services	11
<i>Figure 1.1: Widget mashups in three dimensions: Web, networks and devices</i>	12
The multiplication of standard bodies and challenges of fragmentation	14
<i>Figure 1.2: Standardization approaches and overlaps related to widget development</i>	15
Mobile widget runtime market evolution	16
<i>Figure 1.3: Mobile widget runtime market evolution</i>	16
CHAPTER 2	
THE CHANGING MOBILE HANDSET MARKET LANDSCAPE	21
Handset market segmentation and evolution	21
Mobile handset market segmentation by feature set	21
Basic phones	21
Low-feature phones	22
Feature-rich phones	23
Global mobile handset market trends and forecasts	24
<i>Figure 2.1: Global mobile handset sales, by technology segmentation, 2008-2014</i>	26
Mobile Internet trends and evolution	27
Internet user experience: mobile vs. desktop	27
The role of widgets in enhancing the overall mobile Internet experience	30
Mobile Internet forecasts, 2008-2013	31
<i>Figure 2.2: Global mobile services revenues and mobile Internet market share, 2008-2013</i>	32
The mobile application store phenomenon	33
Industry dynamics	33
<i>Figure 2.3: Key mobile application stores: Addressable market, supporting</i>	35
Market fragmentation	39
Market opportunities and challenges for OEMs	40
What the mobile application store means for handset vendors	40
What are the challenges?	41
Market opportunities and challenges for operators	43
What the application store means for mobile operators	43
What are the challenges?	45
What application store means for OTTs and software solution providers	46
CHAPTER 3	
ENHANCING THE MOBILE BROWSING EXPERIENCE	49
The mobile Internet user experience	49

Web markup language evolution from WAP to XHTML and HTML 5	51
<i>Figure 3.1: Evolution of mobile markup languages (1995-2009)</i>	52
Mobile browser market segmentation	53
Segmentation by implementation process: pre-installed vs. installed later	53
Technology segmentation	55
Scripting technologies: standards-based vs. proprietary technologies	56
<i>Figure 3.2: Types of JavaScript dialects and engines supported by Web browsers and Web runtimes</i>	56
Dynamic content in mobile: The role of AJAX and alternative technologies	57
<i>Figure 3.3: Characteristics of AJAX-based Web applications vs. native applications on mobile phones</i>	58
Embedded vs. downloaded microbrowsers	59
<i>Figure 3.4: Sample of mobile Web browsers with a summary of their characteristics</i>	60
<i>Figure 3.5: Rendering vs. optimization: Vendor choice and connection with browsers</i>	62
Evolution of the mobile browser technology	62
Browser as development environment	62
Mobile browsers and their support for widget runtime	63
<i>Figure 3.6: Mobile Web browsers and their support for mobile Web runtimes (plug-in and stand-alone)</i> ..	63
Future outlook and market development	64
On-Device Portal (ODP) technology	65
The on-device portal market	66
<i>Figure 3.7: Comparison between a WAP portal and an on-device portal</i>	67
<i>Figure 3.8: Sample of current ODP vendors and their support for widgets and idle screen integration</i>	68
Challenges for ODPs and the mobile Web runtime opportunity	69
<i>Figure 3.9: Sample of current MWRT vendors and partners that provide an ODP solution</i>	70
ODP evolution, revenue models and trends	70
Active Idle Screen (AIS) technology	72
<i>Figure 3.10: Components of an idle screen's real estate</i>	72
Major changes in the active idle screen (AIS) market	73
Challenges to the current AIS and mobile Web runtime (MWRT) opportunity	74
<i>Figure 3.11: Sample of MWRT vendors that provide an idle screen solution</i>	76
AIS evolution, revenue models and trends	76
Market dynamics of mobile widgets: native vs. Web-based technologies	79
Different flavors	79
<i>Figure 3.12: Examples of mobile widgets that are powered by mobile Web runtimes</i>	79
<i>Figure 3.13: Typical deployment of a widget platform supported by a server back end.</i>	80
Value proposition and market opportunities	81
<i>Figure 3.14: Widget handset market positioning.</i>	81
User experience: Web widgets vs. Web browsers	83
<i>Figure 3.15: Problems with full mobile Web browsing and the widgets value proposition</i>	83
<i>Figure 3.16: Comparison between mobile widgets, WAP and native mobile applications</i>	83
Widget runtime: native vs. Web-based technologies	84
<i>Figure 3.17: Sample of mobile Web runtime vendors that support widgets</i>	85
Widget evolution and trends	86
Content optimization	89
Is mobile Internet a subset of desktop internet?	89
Different flavors of content optimization and repurposing	89
<i>Figure 3.18: General architecture of a transcoding proxy.</i>	90
<i>Figure 3.19: Examples of mobile content optimization proxy solution providers and their main clients</i> ..	91
<i>Figure 3.20: Advantages and disadvantages of mobile optimization proxies</i>	91
Impact on mobile Web browsing and widget use	92
Optimization proxies: market trends and product positioning	93

CHAPTER 4

EVOLUTION OF MOBILE WIDGET ECOSYSTEMS	95
Mobile Web runtime (MWR) opportunities and challenges	95
Mobile Web runtime architecture and applications	95
<i>Figure 4.1: Mobile Web runtime architecture</i>	96
Advantages of mobile Web runtime for application development	96
The business case for mobile Web runtime	97
Mobile Web runtime market and competition	100
<i>Figure 4.2: Mobile Web runtime providers and their customers</i>	100
Evolution of mobile Web runtime	101
<i>Figure 4.3: Evolution towards mobile Web runtime and rich Internet applications</i>	102
Four criteria in selecting a mobile Web runtime	102
Challenges of mobile Web runtime development	104
Fragmentation	104
Application porting from desktop to mobile	104
Access to device and network APIs	105
Application security	105
Application packaging and distribution	106
Application usability	107
Application monetization	107
Copyright and privacy issues	109
Different approaches to widget ecosystems	110
Different ways of segmenting mobile widget ecosystems	110
Different execution environments	111
Over pre-installed terminal runtime, such as Java ME	111
Over a Web runtime, with optional support for plug-ins	111
Over proprietary client-server architecture	112
Over server-side widgets	112
Over a virtualization layer	113
<i>Figure 4.4: Different approaches to mobile widget runtime execution</i>	113
<i>Figure 4.5: Comparison of mobile widget execution models</i>	114
Different distribution channels	114
Handset-centric distribution	114
Client-server distribution	114
Server-centric distribution	115
Server-based widgets	115
<i>Figure 4.6: Comparison of mobile widget execution models</i>	115
Other key factors in segmenting mobile widget ecosystems	116
<i>Figure 4.7: Mobile widget runtime characteristics: Terminal runtime-based platforms</i>	116
<i>Figure 4.8: Mobile widget runtime characteristics: Terminal runtime-based platforms (with plug-in)</i> ..	117
<i>Figure 4.9: Mobile widget runtime characteristics: Web engine-based platforms (with no plug-in)</i> ..	117
<i>Figure 4.10: Mobile widget runtime characteristics: Client-server based platforms</i>	118
<i>Figure 4.11: Mobile widget runtime characteristics: Server-based platforms</i>	118
Different revenue models	118
<i>Figure 4.12: Revenue model for each mobile widget runtime vendor</i>	119
A widget ecosystem as an enabler of mobile service mashups	121
Access to Web, device and network APIs	121
<i>Figure 4.13: Examples of widget API integration</i>	121
<i>Figure 4.14: Evolution of Web, device and network APIs in mobile application development</i>	122

<i>Figure 4.15: Level of support of various mobile Web runtime vendors to different APIs</i>	123
Web APIs	124
Device APIs	124
<i>Figure 4.16: Commitments of different mobile Web runtime vendors to various device APIs</i>	125
Network APIs	125
<i>Figure 4.17: Operators opening up their network APIs through GSMA OneAPI</i>	126
Widget mashups	126
<i>Figure 4.18: Widget mashups in three dimensions: Web, networks and devices</i>	127
<i>Figure 4.19: The role of APIs in building synergies between devices networks and the web: some concrete examples</i>	127
Standardization trends to reduce fragmentation and security risks in the mobile software value chain	129
The burden of fragmentation	129
Is the mobile Web development environment less fragmented?	129
The multiplication of standard bodies and challenges	130
<i>Figure 4.20: Standardization bodies</i>	131
<i>Figure 4.21: Standardization approaches and overlaps related to widget development</i>	132
W3C	133
<i>Figure 4.22: W3C Widgets compliance</i>	134
OMTP's BONDI	134
Joint Innovation Labs (JIL)	135
GSMA OneAPI	136
<i>Figure 4.23: Operators supporting GSMA OneAPI</i>	137
Khronos Group	137
OpenAjax Alliance (OAA)	138
Future outlook and technology trends	139
Mobile widget runtime market evolution	139
<i>Figure 4.24: Open Web vs. proprietary approach to the implementation of mobile widgets</i>	139
<i>Figure 4.25: Mobile Web runtime market evolution</i>	140
Future market outlook	142
Product differentiation and new opportunities	142
New revenue models for widget ecosystems	144
Future technology outlook	145
Context-based applications based on device APIs/Web mashups	145
Context-based applications based on network APIs/ Web mashups	148
Fragmentation and the role of standardization	149
 CHAPTER 5	
WIDGET ECOSYSTEM QUADRANTS AND VENDOR POSITIONING	151
Widget ecosystem quadrants	151
<i>Figure 5.1: Mobile widget runtime ecosystem quadrants and vendor positioning</i>	152
<i>Figure 5.2: Advantages of closed and open mobile widget runtime platforms</i>	153
Qualcomm Plaza	153
Company overview	153
Widget products and enabling solutions	154
Plaza Mobile Internet	154
<i>Figure 5.3: Qualcomm's Plaza Mobile Internet</i>	154
<i>Figure 5.4: Plaza Mobile Internet widget development and distribution lifecycle</i>	155
Plaza Retail	156

Revenue model for Plaza Mobile Internet and Plaza Retail	156
Customers and partners	157
Strategy and vision including SWOT analysis	157
<i>Figure 5.5: Qualcomm's Plaza Mobile Internet value propositions</i>	158
<i>Figure 5.6: SWOT analysis for Qualcomm's widgets strategy</i>	160
Sun Microsystems	160
Company overview	160
Application and runtime solutions	161
JavaFX mobile	161
<i>Figure 5.7: Marketplace for Sun's JavaFX</i>	162
Java ODP	162
<i>Figure 5.8: Types of Java ODP widgets</i>	162
<i>Figure 5.9: Marketplace for Sun's ODP</i>	163
Project Vector	163
Revenue model	163
Customers and partners	164
Strategy and vision including SWOT analysis	165
<i>Figure 5.10: SWOT analysis for Sun's JavaFX strategy</i>	167
Adobe Flash Platform and AIR Mobile	167
Company overview	167
Adobe Flash platform and Flex for mobile	168
<i>Figure 5.11: Marketplace for Adobe's AIR, Flash Player and Flash Lite, and Mobile Client</i>	168
<i>Figure 5.12: Adobe's mobile runtimes</i>	169
Adobe AIR	169
Adobe AIR Marketplace	170
Flash Lite Distributable Player	170
Adobe Mobile Client	171
Flash Cast ecosystem	171
Revenue model for Adobe Mobile Platform	172
AIR Mobile and Flash Lite	172
Flash Distributable Player	172
Adobe Mobile Client	172
Flash Cast ecosystem	173
Strategy and vision including SWOT analysis	173
<i>Figure 5.13: Adobe AIR Mobile strategy SWOT analysis</i>	175
Access	175
Company overview	175
Netfront solutions	176
Netfront Browser	176
Netfront Widgets	177
<i>Figure 5.14: Downloadable vs. pre-installed Netfront Widgets player</i>	177
<i>Figure 5.15: The Netfront Widget player</i>	178
Revenue model	179
Customers and partners	179
<i>Figure 5.16: Access Netfront Widgets customers, Jun-09</i>	179
Strategy and vision including SWOT analysis	180
<i>Figure 5.17: SWOT analysis for Access Netfront's widget strategy</i>	182
Microsoft	183
Company overview	183

Widget products and solutions	183
Silverlight Mobile	183
<i>Figure 5.18: Microsoft's Silverlight Mobile</i>	185
IE Mobile 6 widget runtime	185
<i>Figure 5.19: Examples of Microsoft IE Mobile 6 widgets</i>	185
The link with Windows Marketplace for Mobile	185
Revenue models	186
Silverlight Mobile	186
IE Mobile widgets	187
Windows Marketplace for Mobile	187
Customers and partners	187
Silverlight Mobile	187
IE Mobile widgets	188
Strategy and vision including SWOT analysis	188
Technology strengths and weaknesses	188
Market opportunities	189
Market threats	189
<i>Figure 5.20: SWOT analysis for Microsoft's mobile widget strategy</i>	190
Google	190
Company overview	190
Widget products and solutions	191
Google Gears	191
<i>Figure 5.21: Google Gears</i>	192
Android	192
<i>Figure 5.22: Google search widget on Android using AppWidget framework</i>	193
Business models	194
Google Gears	194
Android	194
Customers and partners	195
Google Gears	195
Android	195
Strategy and vision including SWOT analysis for Gears	195
<i>Figure 5.23: SWOT analysis for Google's Gears strategy</i>	197
Azingo	197
Company overview	197
Widget products and solutions	198
<i>Figure 5.24: Azingo's widget Web Runtime architecture</i>	199
<i>Figure 5.25: Azingo's Web Runtime modules</i>	200
<i>Figure 5.26: Azingo's Mobile Web Runtime</i>	200
Business case and revenue model	200
Customers and partners	201
Strategy and vision including SWOT analysis	202
<i>Figure 5.27: SWOT analysis for Azingo's widget strategy</i>	203
SurfKitchen	203
Company overview	203
Products and solutions	204
<i>Figure 5.27: SurfKitchen's platform</i>	204
<i>Figure 5.28: SurfKitchen Mobile Web Runtime</i>	206
Revenue model	207

Customers and partners	207
Strategy and vision including SWOT analysis	208
<i>Figure 5.29: SWOT analysis for SurfKitchen's widget strategy</i>	209
Novarra	209
Company overview	209
Products and solutions	209
<i>Figure 5.30: Novarra's Vision platform</i>	210
<i>Figure 5.31: Novarra's mobile Web runtime</i>	212
Revenue model	212
Customers and partners	213
Strategy and vision including SWOT analysis	213
<i>Figure 5.32: SWOT analysis for Novarra's widget strategy</i>	214
Nokia Web Runtime (WRT)	214
Company overview	214
Nokia involvement in the widget ecosystem	214
Are S40 devices widget-less without WidSets?	215
Nokia WRT	215
<i>Figure 5.33: Handset models supporting WRT 1.1, Jul-09</i>	216
<i>Figure 5.34: Nokia Web Runtime platform</i>	217
The link with Symbian Foundation and Horizon project	217
Revenue model of Nokia WRT	218
Customers and partners of Nokia WRT	219
Strategy and vision including SWOT analysis	219
<i>Figure 5.35: SWOT analysis for Nokia WRT strategy</i>	221
CHAPTER 6	
TRENDS OF MOBILE APPLICATIONS DEVELOPMENT	223
The cycle of customer need	223
<i>Figure 6.1: The cycle of customer need</i>	223
Relationship of operators with developer community	224
<i>Figure 6.2: Application development cycle and time to monetization from the mobile operator portal</i> ..	224
Changing operator culture	226
Developer attention is shifting	226
Will application stores change the game?	227
Application development: Web vs. native or both?	229
Mobile native application environment	229
Web application development environment	230
Widgets and operator-branded app stores	232
<i>Figure 6.3: Three centers of gravity for Web applications development</i>	232
Value proposition for developing Web applications and widgets	233
Hybrid applications: the balance between Web and native development environments	235
<i>Figure 6.4: Software platforms for hybrid applications development</i>	236
Mobile Widget ecosystem and the role of open source	236
The business case for open source	236
<i>Figure 6.5: Advantages of adopting open source</i>	237
The role of open source in MWRT development	237
MWRT vendors activities in relation to open source	238
<i>Figure 6.6: Selection of some WRT vendors' activities in relation to open source</i>	239
<i>Figure 6.7: Sample of open source MWRTs</i>	241

The WebKit phenomenon and its influence	241
Could Mozilla Firefox Mobile (Fennec) compete with the WebKit?	242
<i>Figure 6.8: Summary of mobile Web browsers and MWRTs based on open-source Web engines</i>	244

CHAPTER 7

CROSS-PLATFORMIZATION	245
The role of cross-platformization in offering a seamless widget experience	245
The cross-platformization phenomenon	245
<i>Figure 7.1: Cross-platformization scenarios</i>	246
<i>Figure 7.2: Summary of cross-platformization approaches</i>	246
Enabling widgets across multiple device types	247
Enabling widgets across multiple OSs	247
Enabling multiple widgets formats on the same device	248
<i>Figure 7.3: Comparison of the different approaches of mobile widget format enablers</i>	249
Is virtualization the right solution for cross-platformization?	249
Virtualization as cross-platform widget ecosystem enabler	249
<i>Figure 7.4 Virtualization in the context of MWRT</i>	250
<i>Figure 7.5: Characteristics of the two virtualization approaches</i>	251
Middleware-level virtualization	251
Hardware-level virtualization	252
<i>Figure 7.6: Advantages of hardware-level virtualization</i>	252
<i>Figure 7.7: Virtualization platforms and supported OSs</i>	253
Issues with hardware-level virtualization	254

CHAPTER 8

OPERATOR AND VENDOR STRATEGIES	257
OEMs	257
Why mobile content and widgets are so important to OEMs	258
Nokia	260
Motorola	262
Samsung	263
LG	266
Apple	268
Palm	269
Operators	271
Why widgets are important to operators	273
Device APIs vs. network APIs	275
<i>Figure 8.1: Device APIs vs. network APIs and operator positioning</i>	277
Mobile operators rationalizing on terminal platforms	278
Advantages of rationalization	278
Operator choices	279
<i>Figure 8.2: Key terminal software platforms supported by the leading operators</i>	281
Different scenarios for deploying mobile widget solutions	281
Mobile widget runtime: axes of differentiation	282
Widget ecosystem deployment and operators' business models	284
<i>Figure 8.3: Evaluation of mobile widget ecosystem requirements as a function of OEMs' business models</i>	285
Widget ecosystem deployment and OEM business models	288
<i>Figure 8.4: Evaluation of mobile widget ecosystem requirements as a function of OEMs' business models</i>	288

About the Authors



Dr Malik Kamal-Saadi is a Principal Analyst at Informa Telecoms & Media. Within his role, Malik acts as a Thought Leader across different sectors of the global telecommunications industry including Devices, Networks & Infrastructure and Multimedia Services. He has planned, authored and co-authored many Informa Telecoms & Media reports including *Future Mobile Handsets*, *Mobile Applications Platforms & Operating Systems*, *Mobile Network APIs*, *Mobile Broadband Networks*, *Mobile Access at Home*, *Mobile VoIP*, *Open Source in Mobile*, *IP Multimedia Systems (IMS)*, *Mobile Converged Devices*, *Mobile Computing Devices*, and *Metropolitan Area Networks and Switching Technologies*. He has also contributed to the planning for the content of many of Informa events and workshops and was involved in the Telecoms Academy's Mini MBA program.

Malik is a frequent speaker at international conferences on mobile telecommunications. He has over 13 years' experience in the telecommunications industry as a technology expert and analyst following different technologies from inception to maturity. He has also played a key role in a number of European and Government projects.

Malik has a PhD degree from Groupe d'Etude des Semiconducteurs (GES, France), specializing in Semiconductor Devices and Materials, Design and Engineering.



Karim Yaici is an associate Analyst at Informa Telecoms & Media working within the Handsets & Devices sector. He has authored a number of analysis reports on mobile handsets and accessories, mobile software and user generated content.

In the past, Karim has held a number of positions within the Centre for Communication Systems Research (CCSR), UK, working on European research projects in the areas of fixed and wireless communications, media broadcasting, consumer electronics, mobile software development and mobile advertisement. He has also previously worked as a networking engineer at Vodafone R&D (UK).

Karim holds a BEng in Information Systems and a Master of Research from the University of Surrey and an MSc in Information Systems Management from the University of Southampton; he is currently undertaking a part-time PhD in mobile user interface development.