

The Electronic Briefcase

Preliminary Analysis and Background for a Wireless Storage Device

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Introduction

Whipple, Sargent & Associates is a primary market research and strategic planning firm engaged on behalf of clients in numerous markets, but with a current focus on electronics packaging/assembly technology for the next generation of electronics devices. The majority of this work is custom and represented by associates and third party consultants.

Market determinations, feasibility analysis, market/potential/sales projections, market position/profile analysis/models, and market control/research curriculum development represent WS&A's primary areas of business and contracted services. In the process of conducting this business, however, WS&A often discovers ancillary findings and trends which are outside of the work contracted.

In such cases it is the policy of WS&A to disclose the existence, but not necessarily the specific nature, of ancillary findings to the client, and give them the right of first refusal to pursue them. Should they decline, WS&A retains the rights to this information and the option to pursue these findings at our own expense for our own benefit, and to subsequently license, transfer or assign these findings to other interests, or use them in promoting the services of the company.

Such is the case upon which the concept of the *electronic briefcase* has been developed. The findings represent ancillary data from two independent bodies of custom research, with the additional analysis performed at WS&A's expense, preliminary research for a speculative bid, not awarded, and depth follow-up, at the expense of the researcher, to validate the data, expand the detail of the findings, and pre-test scenarios to determine the potential and feasibility of developing and marketing a product using these findings.

It is the general finding that the *electronic briefcase*, as represented in WS&A's proprietary conception, serves a pre-existing 15% subset of the \$1.6 trillion total US domestic data universe as determined by a November 1996 audit control model for the network and wireless connectivity market. Following is an overview of the methodology and background of the concept.

Methodology and Background

Primary quantitative data was drawn from two sources: 1) an April 1996 - December 1996 conjoint , 30,000 base survey curriculum of the global organizational data/networking infrastructure; And 2) a November 1996 - March 1997 pre-test of a choice based conjoint, US Domestic benchmark (2,464 base) curriculum of all consumer and business markets for “next generation” electronic appliances, including computers, cell phones, network devices, imaging devices, entertainment devices, wireless devices and peripherals.

A significant result of the November 1996 - March 1997 pre-test, was the finding that in, 8 of 11 market segmentation classes, for choice selections of categories of offerings, which may be generally described as “next generation human interface applications”, a preponderance or clear majority of respondents selected “None of the above”. Please note that all applications tested were client supplied so specific findings related to these products may not be disclosed.

Open ended, qualitative telephone follow-up interviews were conducted with 147 of the respondents who had selected “None of the above” in the choice sections. Based upon this response, the choice scenarios were revised to include specific factors disclosed by WS&A during follow-up, and a second round of pre-test questionnaires were fielded, resulting in 680 completions using the Research Response Check instrument to eliminate non-response error.

The second pre-test round produced a relevant distribution of response and only minimal incidence of “None of the above”. As it turned out, the follow-up and pre-test were in variance with the contract between WS&A and the client. The client declined the offer to integrate the newly disclosed factors in the curriculum and implement the original survey with another research organization, omitting the “None of the above” option from the product choice scenarios.

Effective December 1, 1997, it was agreed that the new findings from the follow-up and validated by the second round of pre-testing are solely and exclusively the property of Whipple, Sargent & Associates, since they were done at the researcher’s expense, but that specific findings, as they relate to the client’s originally supplied choice scenarios, remain confidential under the original agreement.

The Remote User Interface

The most significant finding from the qualitative follow-up, and that which produced a near consensus in the quantitative validation, are end-user expectations for the attributes of the marginal utility of the human interface, as it relates to all digital, data, or “smart” appliances and devices. We call this the Remote User Interface (RUI).

The key defining feature of the RUI is that it forms a market distinguished by a common need or expectation that remote devices including PDA’s, Lap-Tops, Beepers, Cell-phones, even TV Remote/Set-Top Boxes should function as client side applications in a network with a common intuitive server or database. In a majority of cases, it is the market perception that this common server, hub or “nerve center” would be based upon their personal PC or workstation.

We see the RUI as a breakthrough concept, rather than as a specific product, offering or feature. It is a common goal or attribute which has many manifestations, much like a GUI or WYSIWYG, across all segments (business, MIS, consumer, professional) of their next electronic appliance purchase or specification and not the specific device, though, anecdotally, we have several.

When you think about it, this makes absolute sense. Every breakthrough in the computer industry has been the direct result of new human interfaces (HI). Further, it should be noted that the US domestic universe for all consumption related to a human interface is approximately \$1.6 trillion annually. The global universe is greater than \$3 trillion. This universe comprises an estimate of current expenditure for all media and information transmission and retrieval.

From an historical perspective, the first HI expansion for the computer was from plugs and switches to the punch card, then came the display, the keyboard/display terminal, menus, drop down windows, mouse, graphical user interface (GUI), touch screen, trackball, and some rudimentary voice activation. With each, the total market for computers went through an exponential expansion.

All human interfaces to date, however, lock users to some form of desktop appliance or laptop workstation like appliance. The RUI benchmarks the next level. At a minimum, it allows one to go to the washroom or lunch without losing contact with *their* computer or database.

It should also be noted that many appliances are moving in the direction of an RUI, but are missing key operational imperatives. This is that the interface must intuitively or seamlessly copy to or route via their personal/primary computing device or network. Following is one of the scenarios we have tested.

Business managers want to send and receive E-mail on their cell phones, but they do not want a direct connection or a dedicated mail system. It is imperative that it route through their office both incoming for filtering and redirecting to eliminate spam or low priority messages as well as outbound for spell checking, grammar, punctuation and action by internal office staff and peers.

In other words, they do not want a separate E-mail for their cell phone. They want a remote e-mail interface and one which is voice synthesis and recognition, with a minimum of extra buttons, to their current network. Equally significant is that they would prefer this same interface whether they were at their computer or in their car.

Essentially, the RUI represents a convergence of smart devices, appliances and activities (ie. banking, investments, security, paging) occurring seamlessly around a central hub or nerve center which may variously be defined as the end-users' primary computing device, be it a laptop, their home PC, the office LAN, or an ISP's server.

A further expectation is that the access be, both secure and, to a significant degree omnipresent. Therefore, the access device to this interface must have high portability, either embodied as a key, as in a smartcard, or as a feature within some device they would normally carry with them such as a cellphone or pager.

From the above, one could envision numerous mechanisms by which the formative criteria for the RUI could be addressed including expansion of the cellular/wireless infrastructure and/or expansion of the Internet. These mechanisms, however, would require both adoption of certain standards and an exponential growth in capacity before they could begin to address the market's current expectation for utility. This presents significant factors of load which could delay adoption and result in a fragmented marketplace.

What was needed was a "killer app" to overcome the load factors by providing common, comparable utility to the ideal market expectation, but without the infrastructure requirement or load factors. In June of 1998, the researcher determined that the properties of an "electronic briefcase" satisfy the criteria of a "killer app" or catalyst to stimulate the RUI market.

The Electronic Briefcase

In May and June of 1998, WS&A responded to a request for proposals to provide concept testing using discrete choice scenarios for proposed variations of a wireless (Bluetooth) enabled laptop computing device, software and peripherals to determine market potential. WS&A conducted both factor analysis of the November 1996 - March 1997 Benchmark pre-test data, plus three rounds of qualitative, in-depth ideation, in order to propose and estimate the costs, logistics and time frame to conduct such a test.

This was a speculative proposal, in which WS&A entered into a non-disclosure agreement, specifically covering only those materials and concepts supplied by the prospect in the RFP document. WS&A was not awarded the bid. Therefore, all findings, with the exception of those which directly relate to the items described in the RFP, are ancillary and property of WS&A.

In order to understand the basis of the following discussion, however, it is important that one also understand the relationship of factors or latent criteria (variables) to a market and sales potential. Following is a brief overview.

A market is an existing volume of individuals in the form of consumers or buyer/specifiers who share a common, unsatisfied need along with the means to acquire an offer to satisfy that need (demand), are aware that such a offer exists, and have access to some channel of distribution. Markets are relatively easy to measure using conjoint analysis of survey research. Projecting sales from a market, however, is much more difficult, not only in terms of ultimate volume, but the rate of penetration.

This is because, in addition to demand, access and recognition, which define the market, there are latent criteria, or factors, which directly relate to when, how and/or if the market chooses to satisfy that demand. These factors can be broadly divided into three categories: 1) Legacy Factors, those which pre-exist such as satisfaction, installed base, and experience; 2) Purchase Factors, cost, timeliness, apprehension, convenience: And 3) Load Factors, expectation of benefit/utility, other costs (requires batteries), maintenance.

Further, factors can be both positive and negative and this can vary from segment to segment within a market and even within segments. Common psychographic attributes are often used to delineate Purchase factors within segments. Innovation or newness, for example, creates a positive response for “Early Adopters” so it stimulates sales from this category, but may be a negative for the majority of the same segment, so, in spite of early sales, there may be a substantial gap or maturation before the core market kicks in.

Market potential analysis, therefore, is a process of identifying core segments, identifying relevant legacy and load factors, developing permutations of legacy and load combinations, creating scenarios using conjoint and multi-variate techniques, and pretesting to narrow the scenarios to rank both positively and negatively as competitive, but discrete, choices. This process determines the scope and technique required for the actual fielding of the test, during which ranking is eliminated and respondents are allowed only one choice.

Additionally, respondents to the pre-test are asked to identify key drivers from the top and bottom ranked scenarios and their interpretation or reaction is discussed in depth. This process was completed through three rounds of 10 respondents each, from business and professional sectors, in June of 1998. Normally, in order to gather sufficient data to prepare a bid, only a single round is required to produce an indication of relevant distribution of response to determine an appropriate testing methodology.

In this case, however, the first round produced a consensus of “no appeal” for the test scenarios based upon client provided concepts. This necessitated a second round which included a broader range of scenarios introduced by the researcher. The added scenarios contained features from the RUI hypothesis.

The second round produced distribution of only the RUI scenarios, but again, no statistically significant appeal of the test scenarios. Therefore, the test scenarios were modified with factors of the RUI concept and a third round of testing was fielded. The third round produced measurable appeal spread across all concepts.

The common factor to all scenarios exhibiting a measurable appeal is *seamless access to current end-user files and data*.

Key Driver

It is important to note that nearly all of the features and scenarios tested had merit and in a full blown market analysis would probably have produced greater than nominal potential (greater than 0% but less than 6.7%) but only those scenarios, in which the offerings provided seamless access to current end-user files and data, did response suggest potential of greater than 10%, irrespective of all legacy and load factors.

Seamless access to current end-user files and data may, therefore, be defined as the key driver for 100% of the scenarios for which statistically significant appeal was measured and the only additional utility which differentiated offerings which exhibited no appeal against those which exhibited a measurable appeal. There are, however, numerous mechanisms by which this could be accomplished.

The ideal, for example, would be some sort of universal network where, regardless of where the user was, he could securely access his data, make changes, see updates, send and receive messaging, without any additional steps or learning. In spite of the universal appeal of such an offering, and the high value placed upon it by respondents, the infrastructure to support such an ideal is still a long way off.

This ideal, however, does represent significant thinking behind both the concepts of the network computer and of the "smart card". Both, however, will require a substantial change to the telecommunications infrastructure and replacement of or upgrades to the present installed base of devices before the benefits can be largely realized.

Further, load factors of market apprehension related to privacy, security, autonomy, reliability, and independence appear to be a significant barrier to participation, even should the logistical aspects be addressed.

The most immediate and pragmatic approach would satisfy less than the ideal, but a very substantial market, by eliminating the infrastructure dependence and focusing only on upgrading or adding to those devices currently installed. In a sense, creating device enabled micro-networks around each end-user's needs.

Under the concept of a limited or micro-network, we have analyzed three scenarios: (A) Direct device to device wireless (ie. desktop PC to lap-top PC); (B) Scenario A plus remote device to device connectivity using Internet or LAN; And, (C) use of an intermediary wireless storage device. Under all scenarios, the end-user's database is seamlessly shared or common.

Choice Testing

The first scenario (A), which added only the addition of a common database and seamless updating of the storage systems on both units to the original premise, produced a measurable choice, but introduced a new factor of load in that respondents anticipated that use of such a system required that the two devices be continually in close proximity of each other.

The second scenario (B) addressed the proximity and inconvenience load factor, but could not address the user's security and privacy concerns. Further, respondents remained apprehensive that the integrity of such a database could be maintained or where it would reside. Nevertheless, choice was significantly greater.

In the final scenario, (C), the end-user database resided in portable wireless device, with little or no overt functionality beyond that of providing a common, secure, seamless access to the end-user files. A comparable would be a wireless Jazz or Zip drive, which the user could easily carry in a pocket, purse or briefcase, which could interface with any other wireless enabled device in proximity.

With the exception of the RUI ideal which eliminated any device at all, scenario (C) with an intermediate storage device as the interface presented the majority choice with the lowest aggregate factors of load, and for a portion of respondents, negative load or push as it applied to the wireless storage unit itself.

In all scenarios, however, legacy factors in respect to the installed base of PC and laptop devices and their ability to be upgraded to wireless, as well as the protocols involved, was a top of mind issue. Specific to scenario C was the concern that access to the end-users database may not be available at all remote locations where the end-user would wish to have this drive available.

Utility

The final test to determine market potential is that of utility, and/or as it applies to consumption or multiple purchases, marginal utility. This is a qualitative analysis of how and for what a product will be used including what it will replace, what it will compliment, to what degree, and a determination of comparables. Essentially, what is the fit?

For this test, the key utility finding has proven to be a true “no brainer”. All seven of the ten business respondents who selected scenario C spontaneously identified the utility of a wireless storage device as that of a briefcase, something to carry all their “work and stuff” as its primary use.

Further, the three respondents who did not select C in the choice scenario also identified the utility of C as that of a briefcase and qualified their choice of A or B over C by the fact that they do not use or carry a briefcase and have no need to transport any device containing electronic data.

It seems reasonable therefore, to identify scenario C as the “Electronic Briefcase.” This, then, raises an issue which is currently untested. Under the controls applied for the RUI, disk drives, file management, networks, back-up and storage represent an estimated 15% of universe expenditures.

Due to the ubiquitous nature of the briefcase comparable, however, we are looking at a perception of utility beyond that for which we have a control model, but including all of the existing controls. Further, this has been perceived, in our limited sampling, as the primary utility.

One may therefore state that the Electronic Briefcase will share, replace current means or compliment, at a minimum, 15% of the US domestic data universe which currently we estimate to represent \$1.6 trillion in annual expenditures.

Further, in light of what appears to be a relatively low load involved in the acquisition, combined with what appears to be both pre-existing demand and a readily grasped utility, there is reason to suggest that the market would rapidly accept a commercial product based upon this concept and both trial and long-term rates of penetration would be very high.

Conclusions and Comments

The preceding is a preliminary reporting of research findings along with documentation of methodology, based upon, what may arguably be termed “thin data” as it specifically applies to the Electronic Briefcase, since this was derived directly as the result of only ten interviews. By themselves, the findings have no statistical significance.

As a discovery at the culmination of a curriculum which has included more than 30,000 census based parametric observations of US domestic business applications for computers and networks, however, substantiates both the validity of the Electronic Briefcase and the estimates of market potential. This offering or a comparable will emerge as the “Killer App.” for wireless connectivity.

It is by no means unreasonable to project an existing sales potential in the hundreds of millions for this device and the related peripherals, since analysis would suggest that a market is currently formed. The strategic imperative, therefore, becomes addressing the issues of bringing such a device and its supporting infrastructure (ie. wireless transceiver devices for PC’s and Laptops) to the computer marketplace.

To avoid giving away the whole show, all analysis beyond this point has been intuitive or used secondary sources. Essentially we are anticipating various features and product attributes without substantiating them through a testing procedure.

We, for example, anticipate that such a device would be supported by the user’s PC automatically recognizing the proximity of the user’s own or any other user’s EB device. To this we anticipate the need for both security protocols and the need to automate certain routines such as backing-up or mirroring user files much like a RAID back-up.

We anticipate that data on EB should be safe and recoverable, regardless of power levels, and that both the unit itself as well as the devices with which the EB interfaces should contain some sort of status bar and allow the user to perform checks and maintenance.

We anticipate that beyond the wireless functionality, that the device may require a hard wired functionality, both as a battery charger and as an optional interface to non wireless PCS.

Additionally, issues have been raised as to other features and possible configurations of the device. Should, for example, it contain a similar functionality to a PDA? Should it have cellular features to collect data (ie. E-mail) even when not in proximity to a PC? How big should it be? Should the storage unit be removable?

Here we lack sufficient ancillary data to develop an hypothesis. All of these issues, however, may be addressed through additional research.

Insights and analysis related to the Electronic Briefcase have been at the expense of the researcher. They represent a substantial investment. WS&A is currently engaged in the research of other applications of the RUI on behalf of interests in home networking and telecommunications.

It should be disclosed that a research finding, in and of itself, is not proprietary, but that in aggregate, the conclusions and analysis, in whole and in part, are the intellectual property of Whipple, Sargent & Associates. Reproduction of this material requires the express permission of WS&A, and WS&A reserves the right to claim authorship to its contents including the acronym RUI, the application of the term Remote User Interface, and the term Electronic Briefcase as it applies to a wireless data storage device.



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