Value creation in aggregation – the need for a flexible approach in content aggregation and production to meet future customer demand

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Abstract:
This paper looks to identify and understand the present situation of electronic information aggregators and the challenges they will face as the market develops over the next 3-5 years. What will be the future developments in this area of the industry? How should these organisations see their position within it? How should they develop and diversify to meet the changing needs of the customer? How should they address the requirements and evolution of their supplier partners – and exactly who might these suppliers be? What will be their future content and technical offerings and what supporting value-added services need adding to the overall "solution". Backed by market, customer and supplier analysis and feedback, this paper offers opinions and comment on all these topics and includes market examples of the current situation – and future trend analysis and comment (supported by emerging model review and case studies).

Introduction

The information environment is undergoing a dramatic transformation.

The growth of "the big deal" – and its effect on pricing, licensing and content supply; the changing needs and demands of library customers and electronic information end users; the increasing variety and availability of affordable (customisable) technology; the increasing "direct to market moves" of some primary publishers; the ever growing proliferation of readily available (electronic) full text; and the continuously changing role of the library and its ability to develop (or ask for) their own customised and value added services are all having an impact on the present and future role of the Information Aggregator.

Are services that provided value in the past still providing the same value today – now that the market appears to have moved on? What is the market telling us and where is it moving to? What content, access models and value-added services might there be in the years to come, and will aggregation suppliers (as they currently exist) still be able to provide them?

This paper looks to address these points and give some opinions and food for thought as to how aggregators (and the service they provide) might evolve – moving "beyond aggregation" to add even more value to information products and service provision.

A brief history of time

Firstly, let us review a much simpler past. Intriguingly, this might also provide some pointers for the future – so we should ask ourselves if things are coming full circle (again).

The dictionary definition of Aggregation ("*collection or total: a total or collection of different things added together, or the process of adding them together*" (*MSN Learning and Research* 2003)) describes quite neatly the historic value aggregators delivered to a client – its end product and the service it provided in producing that end product. Aggregators assisted organizations to add value through servicing a collection model based on physicality – information in a physical space where it could be searched and retrieved. A formal, authoritative information structure was built on "search" taxonomies such as card catalogues. Users would physically go to the library "space", which was the aggregation. The "space" facilitated the search – and you knew when you were done. The monopoly of physical media conferred centralized and controlled authority (although by nature of physicality, information dissemination was rationed). Librarians served as "gatekeepers" to all this physical "stuff" – expertly selecting, managing and organizing the physical availability. Success (or worth) of a library was largely based on (and measured by) "numbers of books." – or more specifically, on the numbers of copies of "*world class*" books and journals available in physical form – and the skill and expertise of the "gatekeepers" in locating and recommending the correct, most valuable, or relevant information. Publishers and aggregator vendors gained profit from the information supply and the assistance "services" they provided).

With the advent of electronic information, things began to change. More full text became "electronic". Differing electronic formats became available. OPACS replaced card catalogues, trying to keep up with the growth in information volume and assisting with rapid identification and retrieval. Online indexing services and A&I assisted this process still further. Users adapted.

Aggregators continued to assist the library, the librarian and (via them) the end user, by moving their provision into the electronic arena – converting the information and support services they provided into electronic form and adding further value added support in response to the newly created complexities brought about by online supply (e.g. licensing, networking etc). Some new aggregators came to the fore. The partnership, on the whole, continued to work well – as both sides looked to meet the new challenges.

Today, for the most part, the physical library is still the centre of knowledge and intellectual authority and aggregation is still the "critical mass" of library resources (a place where users *go to find answers*, librarians *serve those users* and vendors and publishers *add value*). Aggregators are viewed as vendors of (primarily electronic) products and services that assist the process – the databases where patrons search for articles. Aggregation is still a core element of overall information provision.

But things are changing rapidly – for both aggregators and the organisations they serve. We are starting to see a far different, more complex picture emerging. Many customers (libraries) are already moving on into a different way of thinking – and adapting their services to meet their changing needs (and those of their users). Other market forces are also coming into play. If aggregators are to survive, they must identify the needs and adapt accordingly.

> *"It is not the strongest of the species that survive, nor the most intelligent, but the most responsive to change". (The Complete Works of Charles-Darwin* 2003*)*

What is the Market telling us?

The role and resultant service proposition of libraries are *having* to change. The complexities of content supply and integration, information access and access control, purchasing, funding and service customisation are increasing. The evolving demands and (online) experience of their users are creating added pressure. If vendors cannot assist in meeting these needs, they may look elsewhere (or do it themselves).

But how and in what ways should an aggregator evolve to meet the demands of this transforming market? Could they adapt even if they wanted to (will market forces allow them?) and do they need to? (Could they stay as they are and "weather the storm")?

In order to identify some answers to these questions I have initially reviewed the general industry environment and what we – as an aggregator – are seeing, as well as detailed some more specific customer feedback on service elements they have suggested they would like to have.

I have then analysed some recent conference papers, speeches and journals that provide perhaps the most significant commentary on the present issues facing any aggregation provider (and most pertinent views on developing market trends that could affect future planning). In this section I have tried to highlight some areas requiring particularly close attention – as well as some possible market responses.

Lastly, I have tried to identify some service offerings you might see emerging in the coming years as well as provide some recommendations for future aggregation service selection.

The general landscape

A broad initial review of some of the more predominant market trends certainly identifies an increasingly complex and challenging environment for aggregation services.

In a market where budgets are increasingly under threat and competition is rising, the need to deliver 'more for less' (or at least the same) has created an intriguing cost / benefit dynamic for aggregators – not least when trying to develop new value added services supplying value for customers as well as differentiators for suppliers.

Customer characteristics are evolving rapidly – customers know more, faster and request differing service requirements & solutions. This is certainly true with the growth and influence of Consortia. End-user influence is also on the increase – often requiring a different marketing approach and closer working relationship with the library to ensure they are enrolled and assisted in meeting this need. The direct approach of primary vendors (publishers) in certain markets necessitate a closer working relationship with these supplier partners – understanding their strategies and ensuring an enhanced service (and little conflict) results.

The demand for more localised content and new, targeted (niche) products requires both global *and* regional strategies – allowing vendor and customer alike to gain most benefit from each. This may also require a more hybrid aggregator / publisher content development proposition. It is well known that technology is increasingly a factor in buying decisions (linking, alerting etc.) and selection of any service now involves a detailed review of the total package (not just content). Structured but highly flexible pricing models are required to address the individual circumstances that emerge as markets in differing sectors, and regions, evolve.

And whilst endeavouring to predict and address all of the above, the aggregator also needs to be adept at anticipating trends and initiatives to ensure they develop solutions that are as "future-proofed" as possible.

Additional customer needs

Customer advisory groups and client visits (not least our own) provide more specific detail on their needs – and those of their users. Again, they do not just revolve around content.

Online product design, functionality and support tools need to be increasing sophisticated but simple to use – facilitating independent end-user research. They ask for a clear and intuitive search interface – to cut down on training time for both librarians, and in turn, their users; the ability to find a key article or a specific piece of information in the minimum time; exhaustive literature searching from a single database; hassle free linking; immediate full-text retrieval, comprehensive and detailed usage reporting – and lots more besides. Product and technical development will need increasing investment and resource.

Aggregation services will also need to be versatile enough to address a diverse set of specific requirements from an increasingly wide range of end-users. Researchers, whether they're researching superconductors, trying to find rare literary works, or working for large media organisations, all want *comprehensiveness* – the security of knowing that they haven't missed anything. Undergraduates want to get to the *relevant* articles, book reviews, case studies etc.

in rapid speed – without sifting through everything. Their lecturers also want them to avoid all sorts of more questionable websites with non-scholarly content. Professionals such as medical staff need to access certain *key journals* on a regular basis – and then have the choice to widen their search or not. Other professionals, such as those working in business, also want these key journals but might also be looking for broader information on a particular topic and do not have much time – so require the facility to customise their search more extensively, depending on the situation.

Aggregator selection will increasingly revolve around meeting these needs and provision of a broader breadth, more cost effective collection of not just the key titles, but top-level "scholarly" content ranges are available. Systems will be judged on usage *and* content – not just content alone.

Cross format / format blind services (and indexes) will be more and more popular. Accessing the key information is the real key – not the format it is in. A full service aggregation provider should be able to fulfil multiple formats, index them all, and have ability to assist transfer of one to the other.

Again, increased investment and service development will be required – not only in technology but also content acquisitions, publisher relations, training, customer service, etc.

Developing Market Views

Flexible systems, services and the "Context Web"

At the "Fiesole Collection Development Retreat Series" in Oxford, August 2003, David Seaman, Director of the Digital Library Foundation, had some very interesting observations from research and user studies they had undertaken.

"*Libraries don't 'shelve' by Publisher and users don't work that way either*". "*We (users) really want to re-shape and re-package the content we subscribe to into a service that is useful at local (i.e. our) level*". "*Innovative users need innovative data – data that will 'play well' with others. Time and convenience are major 'user forces'*" (Seaman, D 2003). This of course presents difficulties on a number of levels for vendors – but is perhaps an opportunity where Aggregators are well placed to work with customers.

"*If you can build a common interface across multiple vendors it's easier to justify expenditure on resources*" (Seaman, D 2003). This is interesting, as it is core to the aggregation offering. Clearly aggregators should look to expand what they are currently doing. It certainly indicates there is still growth potential for "next generation" aggregation services – and customers want them. It also contradicts other opinions that the market is moving on from aggregation offerings.

His views on what customers need to move forward – the five "M"s – also supported our customer feedback on the sort of future service elements they would like.

Services should be *Malleable* – including customer re-shapeable data; *Multiple* – playing across multiple platforms, across multiple formats; *Manageable* – technologies and content structures where customers can be their own local aggregators (includes Institutional Repositories); *Mixable* – encouraging users to mix, match and manage personal and personalised content libraries; and *Massive* – customers just need more, there is just not enough "stuff" yet. But when there is, the other four "M"s need to be applied.

In conversation with Colin Steele, Director of Scholarly Information Strategies at ANU in Australia, at the same retreat, he further endorsed this view, saying that researchers are information rich and time poor – that is, they are overloaded with information and do not have time to master the complex systems currently available. Flexible systems [from future aggregation services] with flexible information and information retrieval are key.

David Worlock, Chairman of EPS Ltd, a leading information industry consultancy based in the UK, provided additional insight at a recent ProQuest Sales Conference. He pointed to the growth of a "tomorrow's network" where supported libraries and end users may be more able to cope with disaggregated content and where natural communities of interest (reflecting powerful users) are created. Here the customer / competitor divide becomes increasingly blurred and any given entity or institution could be either both or neither for the aggregator e.g. initiatives such as DSpace, development of local archives, the growth of Open Access and newly emerging integrators like Extenza *(n.b. - we will deal in more detail with the impact of some of these areas in future sections of this paper).* This "pluralist" content delivery environment blurs the supply / value chain, creating risks for aggregators looking to develop in this space if they are not closely allied to the relevant constituents and have not reviewed their current information distribution (and archival) networks.

However, he also points out that this world is a space where not only content, but access and context are equal kings i.e. where, because of the increasing volume of "stuff" and the varying ways of getting to it, *content* is only valuable in a *context* where it can be used easily and *accessed* easily in one place.

"*In other areas of life we don't go to 11 places to get one thing – we are happier to have tolerable choice via one gateway – but only if we know it is of good quality and we trust the people who have selected it for us*".

"*Searching via Google is fallible. It only covers 19% of the open web and only provides access to words we put in. It doesn't know [and can't extrapolate] what one is thinking about. It cannot add value of "experience" or guidance. Here, searching for meaning becomes as important as searching for word matches, searching for references becomes as important as sourcing full text. No context = no relevance, no comment = no recommendation*".
(Warlock, D 2003)

The aggregator can add certain value to both context and access – by expanding and enhancing their existing abstract and indexing provision, enhancing the editorial content of those abstracts (and potentially "home grown" content) and increasing use (and enhancement) of their inbound / outbound linking and pointing services. Their "critical mass" of broad based content provides an effective foundation. Their interfaces and systems provide the basis of a gateway.

Growth of the NetGen User

Allied in some ways to the above is the rapidly emerging concept of the NetGen User or "the Google generation" and how the industry needs to respond to them.

The average student's centre of knowledge and authority today is the web – a 'just search Google' mentality". When they arrive on campus they are almost totally web-centric. Some end-users even tell us that if they can't find what they want on a system within the first 30 seconds – primarily via the quick search button – they think it isn't worth finding! Even the physicality (physical location) we mentioned earlier is increasingly irrelevant as more and more of the library's information is available online – and not just via computer. Mass personalization and portability in any development discussions will be key. "*For a generation literally weaned on cell phones, IM and pagers, remote access is not going to be sufficient means of engagement*." (Abram, S 2002)

Rather than information organisations and suppliers anticipating user needs and responding to them (the current model), some industry thought leaders are moving to a decided tone of 'well stop fighting it and start doing it'.

Industry analysts are also speculating on this change.

"*Much of the past thrust of those in the information diffusion chain, be they primary publisher, secondary publisher, document provider, librarian or others, were anticipating user needs and responding to them. But, users now control their own destiny by independently accessing information that has not [necessarily] been pre-filtered, and doing so on their own schedule. … The networked world…adds a new dimension... Users now have much more flexibility in finding useful information, formatting it in a manner they desire and, through serendipity, finding other valuable information*." (Outsell Inc, 2003)

However, from an aggregation vendors' perspective it is encouraging to see that the majority of librarian customers still view this total capitulation as a step too far. They would prefer to work with supplier partners in developing products and services that provide a much better balance. If prompted, our users tell us they would prefer an interface that gives them the power, search capability and – above everything else – the premium content quality and selection criteria of the vendor's interface (or OPAC), *combined* with the simplicity of Google. They feel this would help drive usage as well.

Intriguingly, even OutSell adds a balancing conclusion to the article above

"*The value gained from insightful selection of material, careful editing, and ensuring expert review and content quality is needed more than ever…*" (Outsell Inc, 2003)

Again, there are clear messages (and opportunities) for aggregators in this debate. Future models of aggregation (and the librarians those models serve) will need to adapt somewhat to this reality. Students are wasting a lot of time. However, improved abstracting and indexing practices; implementation of linking technologies, partnerships & protocols (e.g. OpenURL); development of flexible (institutional and end user) pricing; and increased future focus on building the tools and reworking the interfaces to get systems working at the next level of interaction (intuitively) for patrons should reap rewards and ensure aggregators' services remain in the value chain.

Open Access and Institutional Repositories

As noted previously, the growing presence of Open Access journals, systems and initiatives will also impact future aggregation services. The speed at which these initiatives will take hold and grow the market in new directions is debateable, but they will present as much an opportunity as a challenge to aggregators. They will need to balance the partnerships they already have with providing abstracting, indexing and pointing services to this ever-increasing (and probably increasingly popular) volume of online information.

Institutional Repositories (IRs) are also an increasingly influential trend. Historically developed to facilitate enhanced access to scholarly journal articles in certain subject areas – e.g. physics and maths – via "pre-prints" (*prior publication posting of primarily preliminary research*!), these "archives" (such as DSpace at MIT, CDL eScholarship Repository, E-Prints etc.) are becoming increasingly popular in concept. They are also rapidly evolving into important mediums for institutional or consortia specific information dissemination across a wider range of research – including health sciences, the humanities and social sciences. Again the type and quality of this information may vary in future, as will the payment models / methods and permissions to view it, but it is plain to see repositories will become an increasingly potent market force – impacting full content availability, access, as well as price. The aggregator needs to be aware of these content partners of tomorrow. They may take a "facilitating" role in sifting the scholarly information from the rest, help again with pointing and A&I, and maybe even assist customers generate their own (localised) solutions.

Full Text Deterioration

At last years IFLA, it was noticed that smaller publishers (e.g. Springer) are starting to move to production, hosting and delivery services such as MetaPress, Ingenta and Extenza. Apparently these services are now more cost effective than these types of Publishers establishing (or maintaining) their own systems. Some aggregators already provide these services and this is an area where others may wish to follow (providing an additional aggregation revenue stream).

This move is also interesting on another level. In an apparent environment where some publishers are going direct to market, it shows a differing perspective on the publisher / aggregator relationship. It is undoubtedly true that in some cases publishers view aggregation as threatening their print or direct online subscriptions – not least as libraries try to save costs in budget conscious times. As a result, some may withdraw their content from aggregation services or add embargoes. The phrase "*full text deterioration*" has been coined in certain circles to describe this scenario.

The far-sighted aggregator needs to ensure they ally with both customer *and* supplier – realising that a healthy print / e-journal and aggregated database revenue stream must co-exist for the good of all. For the publisher they must ensure fair and reasonable use of their intellectual property. This must be at the right price – i.e. not devaluing (commoditising) the product by selling too cheaply (which could cause the publisher to withdraw from aggregation and thus adversely affecting the customer long term). For the customer they must recognise and organise around the fact there may be "licensing gaps" in some aggregated collections (either via ongoing changes in publisher policy, selective content rights e.g. non inclusion of photo and graphical content or embargoed titles). In these cases – where electronic full text is not immediately available – quality abstracting and indexing should be

provided to customers as “resource selectors / locators” for print or electronic alternatives. In-house linking technologies, protocol implementation (e.g. Open URL) and partnerships with gateway services (e.g. SwetsWise), hosting aggregators (e.g. HighWire), Collections (e.g. JSTOR & Project Muse) and of course the publishers themselves are further value adds for externally available e-journals.

Keeping this balance is imperative. By working in collaboration with all sides the aggregator is well placed to coordinate and deliver this wider “*context web*”. By re-affirming their present position in the supply chain – and developing and extending their present capabilities – they can answer present need as well as lay firm foundations for the “next generation” coming through.

An interesting point to add in concluding this particular issue. ProQuest (by way of example) increased their full text content in *just one* of its key databases (ABI) by over 40% in the last year alone, as well as significantly expanding its back file and adding new image content. A similar story can be seen across other major databases. A large majority of this content was from key suppliers of top range (peer reviewed, scholarly) journals. Embargoes are here, but may be masking the bigger picture. At our customers’ request we are also exploring additional non-periodical content as well as emerging (wider ranging) content types and resources (see below). We are reviewing how we might best leverage our specialist publishing and production capabilities to assist in content growth and delivery for all our partners and customers – using our neutral position to test new partnership models, potential new services and gain feedback. In this way major aggregation vendors are already starting to react to (and assist) future content development and access.

Full text fragmentation and the “full text backlash”

Attending last year’s Summer ALA in the US and International Online in the UK revealed a further emerging market dynamic and discussion point. Over 15,000 electronic journals are now thought to exist from an ever-increasing variety of services and suppliers. On reviewing the wide range of offerings on show, customers clearly have a bewildering choice. E-journals can be accessed and acquired singly, in bulk (often thousands) or in specialist packages of different shapes and sizes from a wide range of sources.

This definitely points to an increasingly divergent market and underlines the need for improving the “*context web*” – creating next generation searching and pointing services to the increasing amount of “stuff” in the content web – as well as the ongoing need for sustainable repositories of (aggregated) critical mass. It suggests there is definitely a role for aggregators in the present environment and gives an indication of additional role(s) in the future. In this context, I note again that aggregators should not aim to promote themselves as a direct replacement or alternative to a publishers e-journal offering – but a “seek and find” (anywhere) starting point and destination.

Additionally, the increasingly frequent use of phrases such as “*the fruit stand build*”; “*the cheapest cost per pound*”; “*the “Information pizza - full text content delivered fresh and immediately to your screen*”; “*full text fixation*”; also indicates customers are not entirely happy with the amount of full text (without quality) being loaded into databases.

Any assumption that any text would be amenable to the librarian, as long as growth was evident, has been shown to be not entirely true. There are clearly growing concerns

surrounding massive (undiscerning) full text aggregation, where users (using basic functionality) have to search masses of amorphous full text and largely irrelevant data to retrieve the one or two pieces of vital information – making (mainly) arbitrary decisions as to when to stop "scrolling through" the volume of retrieved articles in order to find them.

This further confirms the view that an aggregator's role in indexing, abstracting and/or providing access (pointing or linking), to *relevant* scholarly information *in context* should become increasingly vital. Google without the refining tools will not be enough. Providing access to broad based, multi format information, from a variety of sources (including Open Access and IR archives) should require the attributes of an aggregation entity. Their ability to reference and/or point to non-electronic holdings and resources (e.g. print & microfilm) from a variety of differing suppliers (including their own) should add further value. Strong editorial focus on selecting (or at least "recommending") content that is of the highest quality (and results relevance) for researchers will be a differentiator. The resurgence of the "finding tool" (noted numerous times throughout this paper) i.e. the need for 'heavy duty', highly confident abstracting and indexing – that leads the user to all applicable resources *in rapid time* increasingly becomes a "basic selection criteria" for any robust aggregation service. Auto-indexing will not be enough. Compromising the index on the notion that the full text is searchable is I believe, flawed. The stronger the interconnectivity in the world, the more important the fundamental pointers of abstracting and indexing become.

Interpreting the detail

Many new drivers and complex issues are affecting the present position and potential future offerings of most aggregation services therefore. Detailed service response from aggregators will have to be well thought out. Incorrect interpretation of (often conflicting) views could lead to failure. Equally, being too firm – or too bullish – in a single market proposition (be it via pricing, product development or positioning) and not listening effectively will definitely not succeed. Telling the customer, rather than working with them, will not work.

However, although some trends and initiatives may appear negative at first glance, it is clear many can be interpreted or re-engineered into a positive response and service proposition for customers. Those aggregators who can successfully identify these positive elements – and turn them into true value – will be the ones who will ultimately survive.

The vast majority of these issues affect both customers (libraries) *and* vendors – and certainly any top-level aggregation service looking to provide a total (content + technology + service) solution should not overlook this fact when trying to sift out the leading trends and needs. This again is where established long term client / vendor relationships pay dividends as trusted partners look to answer the market calls together. As always, opportunity exists where the approach is collaborative.

Future potential

If all the above is taken into account – and analysed successfully – it is clear that one central theme should be addressed if aggregators are to be successful in any significant way. They need to add value by trying to (re-)create the modern models of aggregation – but this time for the evolving "next generation" virtual space.

Using the physical aggregation scenario detailed in the first section of this paper as a base – and transferring it into the electronic arena – a lot of the basic principles and benefits of that model still apply. Many can be replicated or indeed extended. Aggregation will still be the "critical mass" of library resources. A place where users *go to find answers*, librarians *serve those users*, vendors and publishers *add value*. An information centre will still be just that, even if the patron is not physically there. But this time, as the market moves "beyond aggregation" as we know it today, new models will be based just as much on *versatile access and context* (the "*context web*") as the broadest possible content coverage. This will become the new means of defining success.

It is not denied therefore that volume of key data will still be a prime driver. But defining exactly what is key (e.g. peer review, impact factors, open access or recognized publisher, localized repositories and archives, cost versus usage of some "must have" titles – for both faculty and students) and what volume denotes a critical mass (in the realm of quality versus quantity) will become increasingly open to interpretation – and of course, budget.

By developing products and services that address all three elements, the aggregation "breadth and depth" concept will still be able to assist both customers and publishers alike. Entirely new models are not necessarily needed – (re-)applying and extending existing models to emerging situations definitely is.

Some areas you may well see aggregators looking into (and/or adding to their propositions) include:

- Enhancing and expanding the quality, coverage and management of their indexing and abstracts, metadata, controlled vocabularies etc – looking to 'out gun' Google and keep the value in the finding and retrieval of relevant, quality, scholarly information for cross-disciplinary research.
- Possibly offering their expert indexing and editorial skills to partners and customers – assisting in development and access management of their own content (including intra-content linking). Maybe exploring A&I development in areas that are presently not well served.
- Expanding the coverage and quality of the data they host or point to. This not only includes seamless cross-format integration and forward compatibility (eJournals, eBooks, newspapers etc.), but exploring new areas of content availability such as Open Access and repositories. Assisting conversion of print to electronic (again with both suppliers and customers) and broadening electronic indexes to cover (and provide wider visibility for) non-electronic content (e.g. physical journal holdings) as well as new content types.
- Enhancing and expanding their linking technologies – and linking agreements and partnerships – to facilitate this broader based coverage.
- Reviewing publishing capabilities to help fill market gaps (full text and A&I) – and/or assisting partners or customers to develop new electronic content and disseminate it to wider audiences. Even co-developing solutions together. Archival preservation and storage – as well as rights management – would be natural extensions.
- Technology – linking again, and flexible (cross) searching, sub-interfaces and toolsets for differing types of user. Allowing for personalization as well as customisation – but still aiming for the single point of access platform. Powerful search engines designed to yield comprehensive yet highly relevant results (working alongside the A&I to get

the “best answers” quickly and easily). Value-added research tools. Exploring the developments of Wireless, PDA’s and hand-helds. Potentially offering their technologies and platforms to customers and partners to establish or expand their own systems. Infrastructure partnering – working with software players to create embedded content-to-decision making processes. Potentially acquiring key technologies to fill in gaps in the value chain.

- Flexible and diverse pricing models to meet differing budgets, information usage, types of user (e.g. librarian or student) and types of data available (e.g. pay-per-view, discovery level or access level price differentiation).
- Wider-ranging (and customised) technology, content and service offerings for differing market sectors, regions and size / type of customer (not least consortia).
- Closer partnership with the customers themselves – again exploring IR relationships, but also closely embedding content (into their collections and library holdings) and services (into their library systems, OPACS and other learning environments) – becoming more of an integral part of the overall workflow of the customer and their users. Understanding information rich and time poor users and assisting them reveal and access the latest information relevant to them (e.g. advanced alerting services).
- All the time understanding the developing presence and needs of the NetGen User – ensuring all of the above take this “phenomena” into account, but working with the librarian to ensure value and quality are still present in end-user (re)search practices and education.

Although some commentators have put forward opposing views, I believe these last two elements are equally essential for the future success of any aggregation service. Librarians will still be the gatekeepers to the virtual aggregated collections of tomorrow. Even though their roles may shift somewhat in certain areas, they will still be teaching how to search, building portals, keeping up with vendors, titles, and technologies and working to offer a more efficient, reliable “virtual library”. It is even more important, therefore, that aggregators generate new propositions and value added services to assist them in this role – working with their client partners to ensure that value is driven down and appreciated by end users and both parties are not “dis-intermediated” by the services themselves. Vendors should increasingly explore how to provide customers with the ability to integrate (and customize) their offerings into the organizations’ own physical and virtual environments.

In conclusion

To summarize, the library model of aggregation has (unfortunately in some eyes) moved on from a formally structured, rationed, organized and authoritative set of books and journals, housed on campus, mediated by librarians and accessed via an OPAC. Today, librarian-gatekeepers are still wrestling to mediate, put structure to, organize, sift (and increasingly generate) an ever-widening mass of digitised “stuff” – still predominantly searched via multiple search engines on services from multiple vendors (despite the growth of cross-search technologies and protocols).

However, as the market moves into its next generation of electronic information provision, a new model of seamless aggregation may well be possible – one that aggregation vendors, publishers and librarians work together to create – and one that works as well as (or even

better than) the old physical model. Successful aggregators will need to increasingly embrace and support this concept (improving, enhancing and expanding their services accordingly) if they are to remain competitive.

Aggregation is not going away – in fact, it is continuing to grow – it will just be in a different form and (co-)created by a wider range of partners. For example, integrated content *and* service (solution) providers will become more prevalent – assisting customers develop their own tailored solutions. Cheaper technology, tools and technical services will finally provide what customers need. Pointing and finding – *context* – and *versatile access* (e.g. differing interfaces and portable formats like PDA's) will be more established. Pricing will still be a thorny issue – but more equitable and flexible. Open access will be established and growing – and linking will have progressed to a standard(ised) feature in all relevant propositions.

So what selection criteria should the customer or publisher employ when selecting an aggregation partner? What qualities and service elements will identify the best future provider of this sort? A few key pointers are clear.

Don't just look for an "old style" aggregator, but try to identify those "new style" full service providers – integrated suppliers of the widest coverage of broad based content (from the broadest base of premium information providers and the widest range of formats and content types). Ensure the richness and expertise of their abstracting and indexing (their content contribution to the context web). Explore their publishing, archival and technology toolkits – what do they offer and how do they fit with your requirements. Look for premium quality and best value for money in content, pricing, accessibility and control – as well as a range of value added services, resources and expertise to assist in meeting the specific but ever-changing research needs of diverse (specialist) customers and end users.

Look for a professional service offering from a long-term, trustworthy partner who provides best practice, support – and balanced advice. A collaborative, flexible approach, backed by a strong service mentality will be essential. As with all significant market advances, the move to the "next generation" (via the next wave of discovery) will be long and challenging, so choosing an alliance partner with a "safe pair of hands" and extensive knowledge and experience will be vital. For the same reasons, you must also ensure they have a clear, innovative edge and forward facing perspective on the industry (strategies and ideas that demonstrate they are "future focussed"). If you are looking to create the next generation of information resources for customers or users, you want to be sure your aggregation vendor has a firm set of views, backed by robust solutions, to help you achieve your aim.

Finally, once you have checked the *content, context and versatile access* - ensure your aggregator provides a wide range of *choice* – as what you think you will need tomorrow will probably change by the time you get there.

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