Enterprise Mashups: Why did this Web 2.0 service fail?

Parag Uma Kosalge
Grand Valley State University
kosalgep@gvsu.edu

Ashok Kumar
Grand Valley State University
kumara@gvsu.edu

Abstract

Service Oriented Architecture (SOA) is increasingly popular among businesses today. As SOA enables Enterprise Mashups, rapid SOA adoption should lead to adoption of enterprise Mashups provided by IBM and other prominent providers. And yet the adoption is low enough for Yahoo and many others to shelve it. Why did it fail? This research tries to answer empirically by assessing user perception, as Web 2.0 adoption is a bottom-up phenomenon. Six hundred responses over six years are examined using the importance-performance (IP) framework. The research concludes that users find Mashups important for business but find the performance lacking. Adoption may be expected only if performance improves substantially. Users perceive Mashups as important for Online Sales or Customer Service, Promotions and Marketing, and Purchasing and supplier communications. Users find Mashups important across all functional areas, especially Sales, Promotion and marketing, Production and Operations, and Procurement.

Keywords (Required):

Enterprise Mashups, mashups, Web 2.0, adoption, web services, service oriented architecture,

Introduction

Enterprise Mashups are web services that allow end-users to easily assemble customized software from pieces of ready software, much like lego bricks, within minutes. A mashup can address specific concerns of an enterprise in a timely manner, allow the end-user to assemble it exactly the way they want, and have it ready within minutes instead of months. It removes the extensive process of requisitioning, budgeting, planning, and software development. It precludes the IT department while allowing users to directly assemble the software to their exacting needs and then reassemble it to changing needs. Such flexible, customized software can move in sync with the market needs. As each functional unit or department in a business behaves differently (Kosalge and Chatterjee, 2011), mashups make imminent sense. Businesses today increasingly prefer web services (Booz-Allen, 2007; Economist, 2007; Andriole, 2010), but practitioners suggest the adoption rates are low (Bughin, 2009; Bughin and Chui, 2011; Huang, Chiu-chi, and Khurana, 2012). Enterprise mashups were made available by IBM, Yahoo, Microsoft, Google, ARIS, and many others. Most of these are now shelved due to lack of adoption. This research tries to understand the lack of adoption by examining end-user perceptions of importance of Enterprise Mashups in business situations and compares it with their perception of its performance. It uses the importance-performance theory from the area of marketing, which suggests adoption only if the users perceive a product or a service as important while perceiving its performance as meeting or exceeding expectations. Else the product or service needs to improve significantly. An Importance-Performance (IP) analysis is carried out on the Enterprise Mashups technology by using over six hundred responses over a six-year period.

This research also examines assertions by practitioners (such as Economist, 2007) about business utility of web services and development of new theory (Clarke, 2008). Enterprise Mashups is part of the web services or Web 2.0 movement that constitute far more than blogs, wikis, mobile apps, and social networking (Kosalge and Tole, 2010). While few empirical studies go beyond these, web services span the top 4 disruptive technologies today, more than Robotics, genomics, autonomous vehicle, 3D printing, and advanced material combined (Manyika, Chui, Bughin, Dobbs, Bisson, and Marrs, 2013). Organizations are experiencing a power shift where individual users at the operating level — rather than top executives — are driving selection and use of business technologies (McAfee, 2006; Booz-Allen, 2007; Cuff, Hansen,

and Kang, 2008; Stone, 2009). Given the nature of these collaborative technologies, it is difficult for organizations to mandate usage: for instance, they cannot force employees into social networking, blogging, or wiki entries. Nor can they preclude their usage given its ubiquitous access. Adoption of mashups remains predominantly a bottom-up movement. This trend is supported by the rise of the 'Prosumer' [Producer-Consumer], that affirms there is little difference between a content producer and a content consumer (Denegri-Knott and Zwick, 2012) and corporations are no longer the sole creators of content. Content by individual users is gaining credibility and importance, illustrated by Wikipedia, Youtube, and Amazon. The trend is also supported by changes in software development that is moving away from traditional monolithic solutions such as ERPs, to developing software services that enable end users to create their own (Dorner, Draxler, Pipek, and Wulf, 2009), such as Enterprise Mashups.

Literature Review

Importance-performance (IP) analysis, introduced by Martilla and James (1977) and improved by Slack (1994), is a simple, graphical technique widely used to evaluate the importance of any service against customer satisfaction or performance (e.g. O'Neill, Wright, and Fitz, 2001; Skok, Kophamel, and Richardson, 2001). IP analysis is a popular tool for directing executive action for improvement in the quality of their service. While independent assessments of importance or performance on an attribute are valuable, simultaneous consideration of both is required to realize the full potential of the information (Martilla and James, 1977; Graf, Hemmasi, and Nielsen, 1992; Shaw, DeLone, and Niederman, 2002). The importance and performance of the attributes are plotted on a grid, called an IP map. Slack (1994) identifies four zones (Figure 1) starting from the top left (High importance /Low performance), gradually transitioning to the bottom right (High performance / Low importance). The four zones are labeled "urgent action," "improve," "appropriate," and "excess," respectively. He suggests a "lower bound of performance," above which is region for improvement. It is recommended that businesses move from "urgent action" or "excess" zone to the "appropriate" zone by redistributing resources.

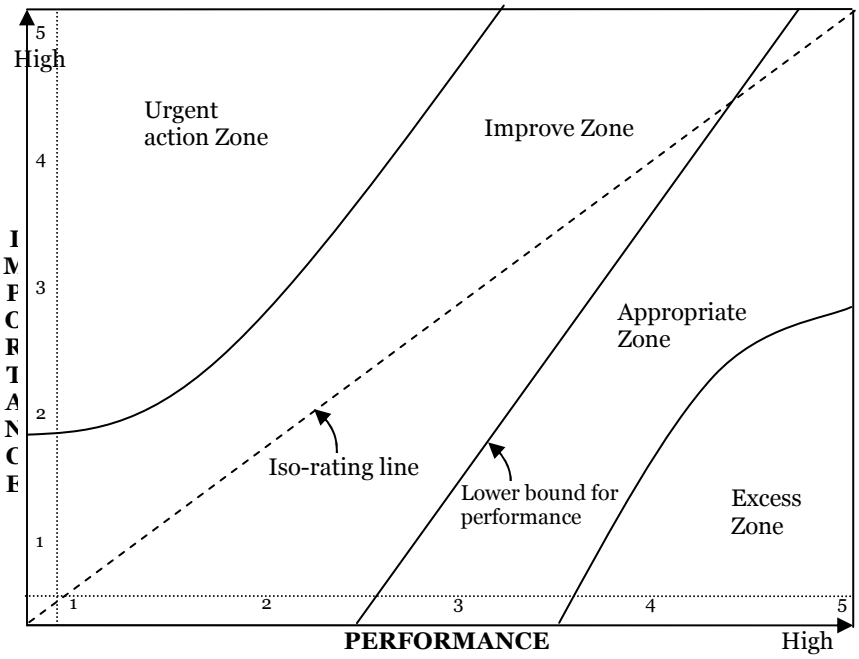


Figure 1: Modified IP map (Slack 1994, Hawes and Rao, 1985, with alterations)

Another model, the "gap" model, identifies performance gaps for each attribute by subtracting satisfaction rating from the importance rating. These gaps are an indication of how well the organization has performed (O'Neill et al., 2001; Skok et al., 2001; Shaw et al., 2002; Roskowski, 2003). Others criticize this method for theoretical shortcomings (e.g., Bacon, 2003), who recommend inserting a 45-degree line, known as iso-rating line, in Figure 1. It represents a balance between importance and performance, and a zero performance gap (Hawes and Rao, 1985; Bacon, 2003). Anything above or below this line indicates a need for change in strategy. It is different from the "lower bound" of the gradient model, as the lower bound of performance line is defined by the firm and may vary from firm to firm, whereas along the iso-rating line, performance equals importance. It is recommended that organizations allocate resources to move attributes to the iso-rating line.

Shaw et al. (2002) used gap analysis to measure service quality of IS/IT systems and concluded that gap analysis is rigorously grounded for appropriate use in IS/IT context. In systems literature, Skok et al. (2001) used IP analysis to evaluate the success of investments in information systems in the health club industry and O'Neill et al. (2001) applied it to evaluate service quality perceptions of online library

services. Throughout this literature, the application of Importance-Performance is predicated on the performance being measured as the customer's satisfaction on the attribute under consideration. This is because "… consumer satisfaction is a function of both expectations related to certain important attributes and judgments of attribute performance" (Martilla and James, 1977, p. 77). In the tradition of all earlier IP researchers (such as Skok et al., 2001; Shaw et al., 2002; Bacon, 2003; Roskowski, 2003; Kosalge, 2014 to name a few), we consider user satisfaction to represent Performance.

In the context of the current study, the organizations are the providers of Mashup services. The Importance-Performance evaluations by users can offer recommendations to providers with valuable directions on perceived business utility and possible adoption among the end-users.

Research Methodology

Enterprise Mashups are created using Mashup editors. So the first stage of the research was to select good representatives for the Enterprise Mashup editor technology. It is expected that business users would typically select only from well known, established market players such as IBM, Microsoft, and Yahoo. The selection was made primarily on the basis of their direct application to business situations and their availability. Over the period of data collection some of the technologies got phased out while others changed. For instance Microsoft Popfly, Google mashups, ARIS mashups, were phased out within a few years of initiation. IBM discarded its QED wiki Enterprise editor in November 2009 in favor of a new solution, IBM Lotus Mashup. While Yahoo pipes provided a mashup editor with increasingly limited capabilities till it finally shelved its web service in 2016.

A self-administered questionnaire was developed as a part of a larger study on end user attitudes and perceptions of Web 2.0 in business. Literature suggests that although there is a strong business interest in Enterprise Mashups, the rate of adoption is very low (Bughin and Manyika, 2007; Bughin, 2009). Further, Web 2.0 technologies cannot be mandated by organizations. They have to depend on the end-users to be motivated and driven to adopt on their own in their daily routine, making Web 2.0 primarily an end-user driven, bottom up phenomenon (Dearstyne, 2007; Cook, 2008). However users, especially those entering the workforce today, are already comfortable operating in the Web 2.0 environment (Cunningham and Wilkins, 2009) and are the early adopters of Web 2.0 inside an organization. Hence the online questionnaire was made available to junior, senior, and graduate students in the college of business. Other researchers (for instance, Lim and Palacios-Marques, 2011; Park, Lee, and Yi, 2011; Kesharwani and Bisht, 2012) have also used students as representative of early adopters in the business world. The survey was pilot tested for clarity and applicability. Exercises were devised to acquaint business students with mashup editors. They also contributed to a wiki analyzing the mashup editors for a shared SWOT analysis. The exercise helped them understand and analyze mashup editors better and intelligently answer the questionnaire. A total of six hundred and four usable responses were collected.

Mashup \ Year:	2007-08	2009-10	2010-11	2011-12	2012-13	2014-15	Total
IBM	21	82	94	76	49	0	322
Yahoo Pipes	0	82	95	76	0	29	282
Total	21	164	189	152	49	29	**604**

Table 1: Questionnaire responses

Data analysis

The questionnaire had a section for the users to evaluate the mashup editors for their importance as well as their performance on a five-point likert scale and over a range of internal business functions. The user perceptions were organized according to (1) the mean importance, and (2) the gap between importance and performance. Applications with higher perceived importance are more likely to see successful adoption, especially if the perceived performance is equally high. All perceptions of importance below the value of three are not discussed as three is the threshold of indifference towards an application.

Mashup editors were found to impact multiple organizational functions. Table 2 shows user perceptions for utility of Mashups for various Functional purposes. If a function is rated high in importance, it may be considered as the primary target for Mashup technology. As the scale used is a 5-point Likert-type scale, an importance level of 3 is the level of indifference. Mashups do not seem to have a high perception of importance for any of the business functions. And the consistent positive gap indicates that the

technology at present does not perform to the expected levels. This makes its adoption seem unlikely unless it improves its performance substantially. If user do happen to choose Mashups, the technology providers can expect adoption for the purposes of interaction with the outside world: customers and suppliers. As it hates high in possibility of employee satisfaction, this technology seems to have a good chance of finding adoption if it succeeds in improving its performance as well as its perception of importance in the minds of the adopters. Table 3 also shows that the biggest gaps in performance are in some of the prime areas of adoption: Promotions and marketing, and Employee satisfaction.

#	Functional Purpose	Mean Imp, 5= Highest	Std Dev	Delta at 95% confi-dence level	Mean Perf. 5= Highest	Std Dev	Delta at 95% confi-dence level	Gap
1	Promotions and marketing	3.452	1.073	0.0857	3.217	1.043	0.0834	0.235
2	Online Sales or Customer service	3.364	1.090	0.0871	3.134	1.049	0.0839	0.230
3	Employee satisfaction	3.260	1.108	0.0948	3.026	1.115	0.0885	0.233
4	Purchasing and supplier communications	3.243	1.091	0.0942	3.053	1.079	0.0855	0.190
5	Production and Operations	3.197	1.131	0.0904	2.997	1.081	0.0863	0.200
6	Human Resources, recruiting	3.119	1.128	0.0872	2.916	1.095	0.0862	0.204
7	Investor communication	3.104	1.178	0.0941	2.921	1.133	0.0905	0.184
8	Finance	2.899	1.186	0.0885	2.677	1.108	0.0891	0.222
9	Accounting	2.829	1.178	0.0901	2.570	1.070	0.0875	0.260

Table 2: Importance-Performance sorted on perceived Importance of Mashup Technology

#	Functional Purpose	Mean Imp, 5=Highest	Std Dev	Mean Perf. 5=Highest	Std Dev	I-P Gap
9	Accounting	2.829	1.178	2.570	1.070	0.260
1	Promotions and marketing	3.452	1.073	3.217	1.043	0.235
3	Employee satisfaction	3.260	1.108	3.026	1.115	0.233
2	Online Sales or Customer service	3.364	1.090	3.134	1.049	0.230
8	Finance	2.899	1.186	2.677	1.108	0.222
6	Human Resources, recruiting	3.119	1.128	2.916	1.095	0.204
5	Production and Operations	3.197	1.131	2.997	1.081	0.200
4	Purchasing and supplier communications	3.243	1.091	3.053	1.079	0.190
7	Investor communication	3.104	1.178	2.921	1.133	0.184

Table 3: Gap analysis of Importance--Performance

Table 4 is the SAS correlation analysis with Spearman coefficient. It shows that there is not enough evidence to conclude any correlation with years in column 1. This means that neither importance or performance on any of the business-function aspects of this technology show progressive or regressive characteristics. Also as seen in Table 4, there is no visual correlation between performance and the years. It is also evident that every variable is correlated with others at significance level of <.001, showing that they are testing the same construct, that of importance and performance, and that each plays a part in this analysis. This provides the construct validity.

RESULTS

If the performance of a business technology matches or exceeds its importance to the business user, it may be concluded that the technology is ready for adoption by the business world. Without exception, the performance of Mashup technologies is lower than the importance for each application with no significant improvement over the years. This suggests that Mashup technologies do not meet the performance expectations of the users although they find them somewhat important. When the data from Table 2 is placed on the Importance-Performance map, Figure 2, 3, 4 and Table 5 show that Mashup technologies are positioned in the Improve zone. They barely meet the iso-rating line, let alone the lower bound of performance expectation from a business. If they evolve and improve, we may expect an increase in adoption. The progress in six years is not heartening. It would need a step change in perceived performance for significant adoption.

	Spearman Correlation Coefficients, N = 604 Prob > |r| under H0: Rho=0	Year	Var 1	Var 2	Var 3	Var 4	Var 5	Var 6	Var 7	Var 8	Var 9
	Year	1									
Var1	**Promotions_marketing_Importance**	-0.060	1								
		0.1393									
2	**Promotions_marketing_Perf**	-0.071	0.735	1							
		0.0829	<.0001								
3	**Online_Sales_Customer_Importance**	-0.049	0.664	0.498	1						
		0.2246	<.0001	<.0001							
4	**Online_Sales_Customer_Perf**	-0.036	0.477	0.674	0.719	1					
		0.377	<.0001	<.0001	<.0001						
5	**Finance_Importance**	0.038	0.537	0.330	0.553	0.364	1				
		0.351	<.0001	<.0001	<.0001	<.0001					
6	**Finance_Performance**	0.058	0.338	0.480	0.356	0.484	0.734	1			
		0.154	<.0001	<.0001	<.0001	<.0001	<.0001				
7	**Accounting_Importance**	0.033	0.548	0.362	0.569	0.370	0.915	0.675	1		
		0.418	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001			
8	**Accounting_Perf**	0.033	0.340	0.465	0.350	0.478	0.665	0.883	0.714	1	
		0.420	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001		
9	**Production_Operations_Importance**	-0.027	0.520	0.321	0.526	0.359	0.638	0.434	0.628	0.447	1
		0.501	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	
10	**Production_Operations_Perf**	-0.017	0.333	0.436	0.339	0.474	0.440	0.591	0.428	0.591	0.750
		0.672	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001
11	**Purchasing_supplier_Importance**	-0.052	0.538	0.380	0.604	0.432	0.614	0.424	0.610	0.418	0.721
		0.202	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001
12	**Purchasing_supplier_Performance**	-0.055	0.358	0.502	0.427	0.549	0.422	0.571	0.402	0.563	0.525
		0.180	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001
13	**Investor_comm_Importance**	-0.023	0.511	0.386	0.542	0.382	0.686	0.507	0.664	0.482	0.610
		0.568	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001
14	**Investor_comm_Performance**	-0.022	0.363	0.475	0.382	0.477	0.493	0.645	0.475	0.617	0.446
		0.585	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001
15	**Employee_satisf_Importance**	-0.117	0.506	0.377	0.539	0.377	0.563	0.360	0.561	0.360	0.621
		0.004	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001
16	**Employee_satisf_Perf**	-0.117	0.319	0.470	0.351	0.485	0.356	0.484	0.348	0.494	0.422
		0.004	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001
17	**Human_Resources_Importance**	-0.078	0.523	0.373	0.566	0.385	0.593	0.380	0.618	0.416	0.630
		0.055	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001
18	**Human_Resources_Perf**	-0.057	0.346	0.478	0.372	0.476	0.382	0.525	0.409	0.548	0.428
		0.162	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001

Truncated right-side of the above table continued...

Var	Spearman Correlation Coefficients, N = 604 Prob > |r| under H0: Rho=0	Var 10	Var 11	Var 12	Var 13	Var 14	Var 15	Var 16	Var 17	Var 18
10	**Production_Operations_Perf**	1								
11	**Purchasing_supplier_Importance**	0.565 <.0001	1							
12	**Purchasing_supplier_Performance**	0.697 <.0001	0.755 <.0001	1						
13	**Investor_comm_Importance**	0.453 <.0001	0.715 <.0001	0.559 <.0001	1					
14	**Investor_comm_Performance**	0.584 <.0001	0.561 <.0001	0.711 <.0001	0.784 <.0001	1				
15	**Employee_net_satisf_Importance**	0.441 <.0001	0.640 <.0001	0.455 <.0001	0.633 <.0001	0.462 <.0001	1			
16	**Employee_net_satisf_Perf**	0.558 <.0001	0.450 <.0001	0.619 <.0001	0.468 <.0001	0.615 <.0001	0.740 <.0001	1		
17	**Human_Resources_recru_Importance**	0.434 <.0001	0.643 <.0001	0.456 <.0001	0.639 <.0001	0.449 <.0001	0.713 <.0001	0.517 <.0001	1	
18	**Human_Resources_Perf**	0.559 <.0001	0.456 <.0001	0.619 <.0001	0.470 <.0001	0.609 <.0001	0.513 <.0001	0.697 <.0001	0.747 <.0001	1

Table 4: Importance—Performance Correlations with Pearson Coefficients

Year:	Overall		2007-08		2009-10		2010-11		2011-12		2012-13		2014-15	
Functional area	**Imp**	**Perf**	**Imp**	**Perf**	**Imp**	**Perf**	**Imp**	**Perf**	**Imp**	**Perf**	**Imp**	**Perf**	**Imp**	**Perf**
Promotions and marketing	3.217	3.452	3.714	3.810	3.476	3.201	3.487	3.228	3.520	3.362	3.041	2.816	3.241	2.724
Online Sales or Customer service	3.134	3.364	3.381	3.333	3.378	3.104	3.423	3.196	3.467	3.243	3.041	2.918	2.897	2.552
Employee satisfaction	2.677	2.899	2.190	2.286	2.890	2.555	2.952	2.714	3.079	2.993	2.551	2.327	2.759	2.345
Purchasing and supplier communications	2.570	2.829	2.143	2.190	2.854	2.518	2.857	2.561	2.993	2.875	2.551	2.245	2.621	2.138
Production and Operations	2.997	3.197	2.667	2.667	3.262	2.963	3.291	3.138	3.224	3.132	2.857	2.592	3.034	2.483
Human Resources, recruiting	3.053	3.243	3.190	3.190	3.238	3.012	3.402	3.180	3.197	3.112	2.898	2.673	3.103	2.690
Investor communication	2.921	3.104	3.048	3.000	3.061	2.829	3.238	3.048	3.138	3.066	2.755	2.469	2.931	2.552
Finance	3.026	3.260	3.619	3.619	3.299	3.006	3.397	3.159	3.243	3.105	2.735	2.388	2.862	2.517
Accounting	2.916	3.119	3.048	3.000	3.207	2.878	3.201	3.048	3.105	3.033	2.735	2.408	2.862	2.448

Table 5: Importance—Performance movement over the years in table and then in graph below.

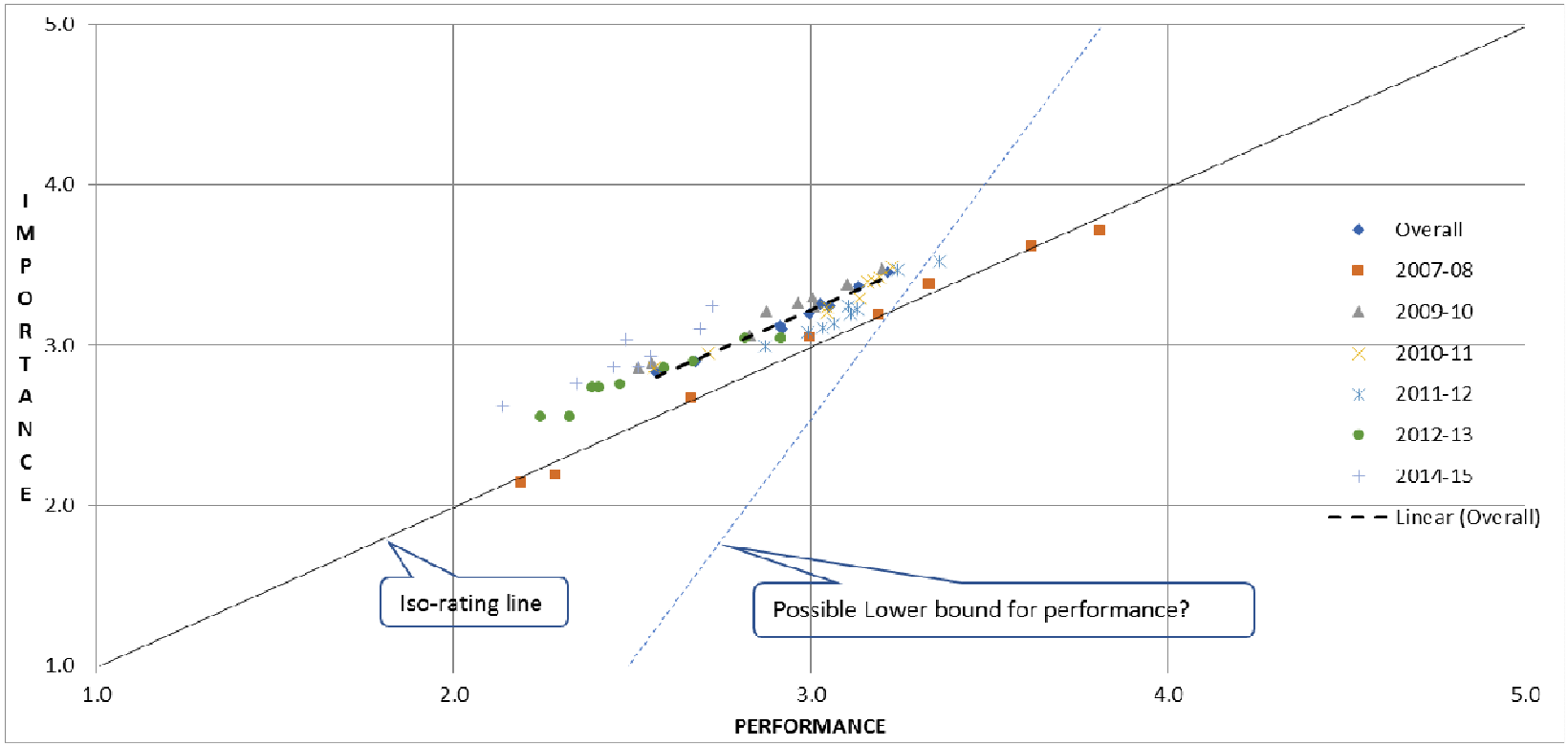


Figure 2: Importance—Performance movement over the years: a graphical representation

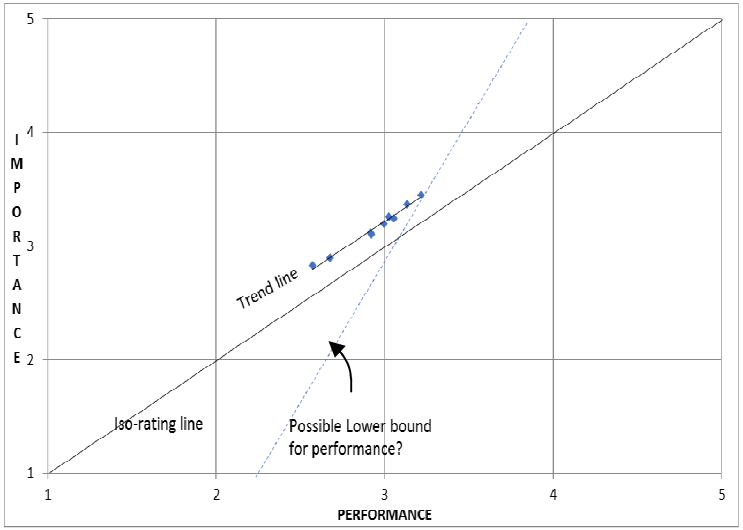


Figure 3: Linear (Overall) data plotted on the IP map

The providers of Mashup technologies could face four possible trajectories as shown in Figure 4. The providers may prefer the shortest path to the iso-metric line (c) but may actually face the long-haul of path (a). As they improve performance by adding features, business users could find more uses and become increasingly dependent on them for daily operations. This keeps increasing the importance as seen in path (a). Another competing possibility is that as the performance of the technology improves it may increasingly fade into the background to become part of the user expectation from the web, such as email and browser. In such cases an improvement in performance may result in greater adoption but the perception of importance or criticality of Mashups may stay the same or even reduce as shown in path (b) and (c). Some technology providers fail to improve performance soon enough either due to technological limitations such as computing speeds, lack of usable web services, lack of maintenance and update of web services due to economic downturn. Mashups can see user interest dwindle as they seek alternate solutions. This can lead to trajectory (d) where the perception of importance drops to an extent where it attracts and becomes appropriate for users with much lower expectations, leading to a possible demise. The last path appears to have come true for Mashups as the service offerings continuously dwindled in Yahoo Pipes till it shut down in 2015, and only IBM Enterprise Mashups remained in the field. Literature on importance-performance mapping confirms such relationships (Sampson and Showalter (1999), Matzler, et.al (2004), Roskowski (2003)). Figure 4 offers hope as it shows the situation is far from hopeless. The technology is presently firmly in the improve zone without a need for urgent action or radical redesign. Therefore a good market for these technologies may be expected in the future.

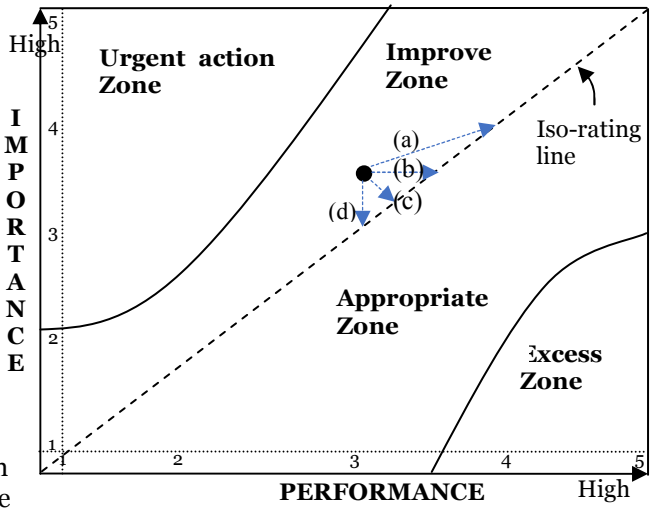


Figure 4: Possible trajectories

The data analysis leads to several other observations. Practitioner literature shows that top business executives rate Mashup technologies very high, as seen in Figure 5. While Table 2 suggests end-user perception of the technology do not support adoption.

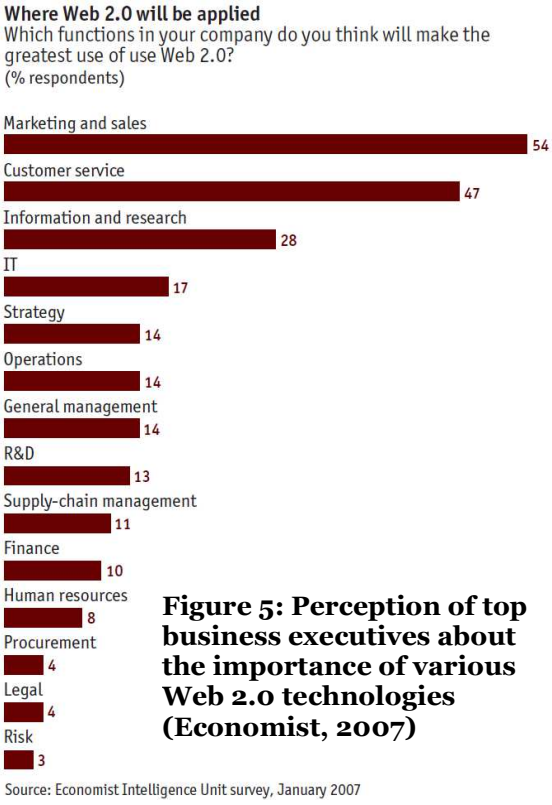
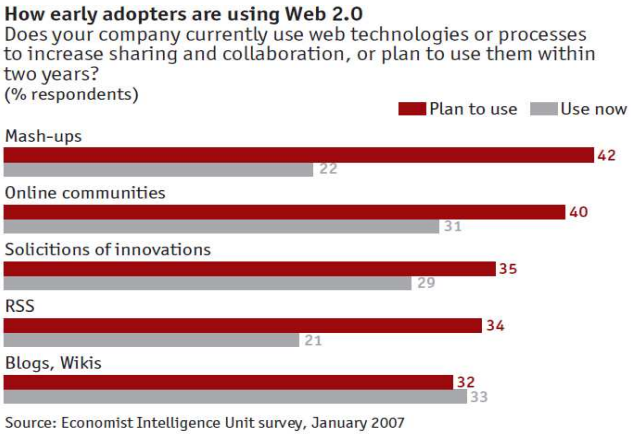


Figure 5: Perception of top business executives about the importance of various Web 2.0 technologies (Economist, 2007)



Practitioner literature suggests that business executives believe certain functional areas will find extensive use for Mashups (Figure 5). Some of these perceptions match with the perceptions of the end users while others do not. Table 2 shows that while every business function finds use for Mashups, it is particularly useful in *Promotions and marketing* and *Online Sales or Customer service*. Applications with highest perceived

importance are the natural primary targets for adoption of Mashup technology.

Conclusion

Businesses today recognize the importance of web services and yet the reported adoption rates are abysmal (Jiang, Raghupathi, and Raghupathi, 2009; Bughin and Chui, 2011; Huang et al., 2012). The intention of this research is to find if the emerging Enterprise Mashup technology is ready for adoption by the business world. Organizations can neither enforce nor preclude employees from using web services due to its ubiquity (Dearstyne, 2007; Cook, 2008). So the adoption of Web 2.0 is primarily driven by the end users especially the new generation entering the workforce that is already comfortable with the Web 2.0 (Cunningham and Wilkins, 2009). This research focuses on examining the user perceptions about the importance of Web 2.0 technologies in business situations and comparing it with their perception of its performance.

The Importance-Performance theory from the marketing domain posits that if the expected performance of Web 2.0 technologies matches the user perceptions of its importance, then it is ready for adoption by the business world. The study finds that for the perceived performance is lower than the perceived importance without a single exception. This may be expected from technologies that are rapidly evolving. The performance gap places them above the iso-rating line in Figure 2, placing them in the 'Improve' zone. The performance gap is significant and if the technologies improve their performance we should find adoption. We conclude that only when the Enterprise Mashup technologies move to the 'Appropriate' zone we may witness widespread adoption. We also provide some observations on strategies that the providers may follow to improve performance. This provides areas of improvement for Enterprise Mashup providers. One of the problems with Mashup editors is the availability of web services, especially enterprise applications in the form of mashable widgets. This is made possible by Service Oriented Architecture or SOA, a growing trend in enterprise information systems (Tewary and Kosalge, 2013). In a few years, when most businesses have SOA, the scope of mashups editors may advance vastly, increasing their importance for business functions and taking mashups on path (a) in figure 4. Either way, the providers will certainly need to improve performance before expecting adoption.

As this is one of the few empirical investigations on Enterprise Mashup technologies and its use in business, the study forms an important contribution for academicians. The IP analysis provides insights into the perceptions of this technology and its adoption. Practitioners can refocus their efforts to leverage what the users perceive to be important. The user perceptions of Web applications can help academicians as well as the practitioners better understand the usage of Web services such as Mashups.

REFERENCES

Andriole, S. 2010. "Business Impact of Web 2.0 Technologies." *Association for Computing Machinery. Communications of the ACM,* (53: 12), pp. 67.

Bacon, D. R. 2003. "A Comparison of Approaches to Importance-Performance Analysis." *International Journal of Market Research,* (45: 1), pp. 55-71.

Booz-Allen 2007. "International study urges businesses to adapt to Web 2.0 "phenomenon"", Accessed at: http://www.boozallen.com/publications/article/29354647, on Feb 2010.

Bughin, J. 2009. "How companies are benefiting from Web 2.0: Selected McKinsey Global Survey Results.." *McKinsey Quarterly,* (4), pp. 84-85.

Bughin, J. and Chui, M. 2011. "How Web 2.0 pays off: The growth dividend enjoyed by networked enterprises." *The McKinsey Quarterly,* (--: 2), pp. 17-21.

Bughin, J. and Manyika, J. 2007. "How businesses are using Web 2.0: A McKinsey global survey", Accessed at: http://www.skmf.net/fileadmin/redaktion/aktiver_content/01_Events/080514_SWISS_KM_Tool_Tag/Track_0_Other_Material/0005_How_firms_use_Web20.pdf, on November 2013.

Clarke, R. 2008. "Web 2.0 as syndication." *Journal of Theoretical and Applied Electronic Commerce Research,* (3: 2), pp. 30.

Cook, S. 2008. "The contribution revolution: letting volunteers build your business." *Harvard Business Review,* (86: 10), pp. 60-69.

Cuff, D., Hansen, M., and Kang, J. 2008. "Urban sensing: out of the woods." *Communications of the ACM,* (51: 3), pp. 24.

Cunningham, P. C. and Wilkins, J. C. 2009. "A walk in the cloud." *Information Management Journal,* (43: 1), pp. 22.

Dearstyne, B. W. 2007. "Blogs, mashups, & wikis: Oh, my!." *Information Management Journal,* (41: 4), pp. 25.

Denegri-Knott, J. and Zwick, D. 2012. "Tracking Prosumption Work on eBay: Reproduction of Desire and the Challenge of Slow Re-McDonaldization." *American Behavioral Scientist,* (56: 4), pp. 439-458.

Dorner, C., Draxler, S., Pipek, V., and Wulf, V. 2009. "End Users at the Bazaar: Designing Next-Generation Enterprise Resource Planning Systems." *IEEE Software,* (26: 5), pp. 45.

Economist 2007. "Serious business: Web 2.0 goes corporate, Report from the Economist Intelligent Unit, sponsored by Fast.", Accessed at: http://socialmediagroup.ca/wp-content/uploads/2007/06/smg_eiu_web20.pdf, on Feb 2009.

Graf, L. A., Hemmasi, M., and Nielsen, W. 1992. "Importance-Satisfaction Analysis: A Diagnostic Tool for Organizational Change." *Leadership and Organization Development Journal,* (13: 6), pp. 8-12.

Hawes, J. M. and Rao, C. P. 1985. "Using Importance-Performance Analysis to Develop Health Care Marketing Strategies." *Journal of Health Care Marketing,* (5: 4), pp. 19-25.

Huang, E., Chiu-chi, A. C., and Khurana, P. 2012. "Users' preferred interactive e-health tools on hospital web sites." *International Journal of Pharmaceutical and Healthcare Marketing,* (6: 3), pp. 215-229.

Jiang, Y., Raghupathi, V., and Raghupathi, W. 2009. "Content and design of corporate governance web sites." *Information Systems Management,* (26: 1), pp. 13.

Kesharwani, A. and Bisht, S. S. 2012. "The impact of trust and perceived risk on internet banking adoption in India: An extension of technology acceptance model." *The International Journal of Bank Marketing,* (30: 4), pp. 303-322.

Kosalge, P. and Chatterjee, D. 2011. "Look Before You Leap into ERP Implementation: An Object-Oriented Approach to Business Process Modeling." *Communications of the Association for Information Systems,* (28: 30), pp. 509-536.

Kosalge, P. U. 2014. "An empirical examination of Web 2.0 technologies and its readiness for business." *International Journal of Business Information Systems* (19: 1), pp. 19-40.

Kosalge, P. U. and Tole, O. 2010. "Web 2.0 and business: Early results on perceptions of Web 2.0 and factors influencing its adoption". *Proceedings of the Sixteenth Americas Conference on Information Systems*.pp. 0-10.

Lim, S. and Palacios-Marques, D. 2011. "Culture and purpose of Web 2.0 service adoption: a study in the USA, Korea and Spain." *The Service Industries Journal,* (13: 1), pp. 123-131.

Manyika, J., Chui, M., Bughin, J., Dobbs, R., Bisson, P., and Marrs, A. 2013. "*Disruptive technologies: Advances that will transform life, business, and the global economy*", McKinsey Global Institute San Francisco, CA: http://www.mckinsey.com/business-functions/business-technology/our-insights/disruptive-technologies,

Martilla, J. A. and James, J. C. 1977. "Importance-Performance Analysis." *Journal of Marketing,* (41: 1), pp. 77-79.

McAfee, A. P. 2006. "Enterprise 2.0: The dawn of emergent collaboration." *MIT Sloan Management Review,* (47: 3), pp. 21.

O'Neill, M., Wright, C., and Fitz, F. 2001. "Quality Evaluation in On-Line Service Environments: An Application of the Importance-Performance Measurement Technique." *Managing Service Quality,* (11: 6), pp. 402-417.

Park, S.-H., Lee, L., and Yi, M. Y. 2011. "Group-level effects of facilitating conditions on individual acceptance of information systems." *Information Technology and Management,* (pp.

Roskowski, M. J. 2003. "The Nature of the Importance-Satisfaction Relationship in Ratings: Evidence from the Normative Data of the Noel-Levitz Student Satisfaction Inventory." *Journal of Consumer Satisfaction, Dissatisfaction and Complaining Behavior,* (16: pp. 211-221.

Shaw, N. C., DeLone, W. H., and Niederman, F. 2002. "Sources of Dissatisfaction in End-User Support: An Empirical Study." *Database for Advances in Information Systems,* (33: 2), pp. 41-56.

Skok, W., Kophamel, A., and Richardson, I. 2001. "Diagnosing Information Systems Success: Importance-Performance Maps in the Health Club Industry." *Information & Management,* (38: pp. 409-419.

Slack, N. 1994. "The Importance-Performance Matrix as a Determinant of Improvement Priority." *International Journal of Operations & Production Management,* (14: 5), pp. 59-76.

Stone, M. 2009. "Staying customer-focused and trusted: Web 2.0 and Customer 2.0 in financial services." *Journal of Database Marketing & Customer Strategy Management,* (16: 2), pp. 101.

Tewary, A. and Kosalge, P. U. 2013. "Implementing Service Oriented Architecture – a case study." *International Journal of Business Information Systems,* (14: 2), pp. 164-181.