STRATEGIES OF ENTREPRENEURIAL SOFTWARE DEVELOPING COMPANIES (ESDCs) IN MALAYSIA AND BANGLADESH: A COMPARATIVE ANALYSIS FOR SUSTAINABLE DEVELOPMENT OF ESDCs IN BANGLADESH

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INTRODUCTION

The increasing pace of changes in software developing industry (SDI) is forcing Entrepreneurial Software Developing Companies (ESDCs) to make their strategies explicit. This has given rise to various successful strategies and management practices of the ESDCs over the years (Hill and Jones, 1995). For many developing countries, however, the underlying issues resolve around finding the most viable development strategy of technology advancement. These countries seem to have inadequate technological capability and lack of core competency to determine the plan most relevant with their development goals that will maximize utility of their abundant human resources and minimize the usage of their scarce resources. To utilize the resources effectively and to develop capability and core competency ESDCs have to apply appropriate strategies at all levels. ESDCs are the most fragile firms. The nature of their vulnerability is due to the rapid rate of technological change, market volatility and uncertainty, competition, employee technical skills, resource constraints and the technology-based entrepreneur founding team (Slatter, 1992; Riggs, 1995; Bruch, 1997; Newell and Saxberg 1985, Shanklin 1985, Rogers, 1995). Due to its fragile nature, the strategic consideration becomes even more important. ESDCs are also oriented to business services along with innovation (Swierczek, 1992). As such, they are important for a nation's

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economy and development. Many of them are innovators and developers of tomorrow's industrial technology on which the respective countries future economic progress depend (Glinow and Mohrman, 1990). Hence to develop ESDCs, business support services are also very much required. This is a case for both Bangladesh and Malaysia.

SDI is becoming a strategic sector for Bangladesh. Here, the ESDCs have been growing since mid-eighties. Today, there is a proliferation in this technology-based sector. Their development is not remarkable (Mamun, 1988 and 1990). It is assumed that the problems of practicing management and strategy are hindering the development and sustainability of this sector. Entrepreneurial Software Developing Companies in Bangladesh (BSDCs) require proper technological resources, and technological capabilities in developing core competency for sustainable development. Thus, companies need appropriate strategies and management practices. On the other hand, Malaysia is an emerging economy in Asia. Malaysian software industry also emerged during mid-eighties. But today Malaysian Software Developing Companies (MSDCs) are more entrenched than BSDCs. They are growing steadily. Therefore, a study focusing the strategy for software and market development of MSDCs can bring ideas for the BSDCs for survival and business advancement. Thus, this comparative study on 'strategies for ESDCs in Malaysia and Bangladesh' is very important in order to identify the gaps of the strategies undertaken by the firms in these two countries. As limited studies have been done on entrepreneurial technology-based service firms, this study focusing the strategies for software and market development of ESDCs and their sustainable growth is an important attempt in this regard. The significance of the study lies in its expected results which would guide the software development entrepreneurs of Bangladesh in formulating and implementing appropriate strategies (business and technology) for software and market development in order to increase their efficiency and sustainable growth.

It is evident from the above discussions that appropriate strategies for software and its market development in Bangladesh are imperative for improving ESDCs performance. Given this fact, specifically, this study (a) compares the actual strategy for service and market development applied by Bangladeshi and Malaysian ESDCs and identifies their major differences; (b) draws lessons from successful MSDCs for improving the strategic management of service and market development in Bangladesh, and finally (c) develops a strategic framework for service (software) and market development of ESDCs in Bangladesh. The study was conducted in 1997/98 by investigating a limited number of leading ESDCs in Bangladesh (7) and in Malaysia (9). Bangladeshi companies are located in Dhaka - the capital of Bangladesh and the hub of software developing industry. There are about fifty computer firms in Bangladesh. But less than half of these firms are involved in software development. On the other hand, all the studied Malaysian companies are located in Kuala Lumpur mainly at Technology Park (TPM) and in

few other places. There are about 35 software developing companies enlisted in TPM as of December 1997. Most of them are leading software developing firms. In fact, government of Malaysia has marked this place to enhance R & D of this sector. Data collection for the study was done through structured questionnaire and interviews with CEOs and managers of these companies. Data were also collected from the secondary sources such as company prospectus, bulletins, manuals, published articles and company reports. Qualitative judgment was applied based on personal observation and interview with the said companies

COMPARATIVE EVALUATION OF MSDCS AND BSDCS

The study noted a number of strategic similarities and differences between entrepreneurial MSDCs and BSDCs. Differences are observed in areas such as business and technology strategies, use of technological resources, management of technical people and internal control, operating environment (internal and external), industry growth, core competency, partnering strategy, etc. On the other hand, similarities are found in ownership patterns, emphasis on humanware, customers needs and market demands, entrepreneurs involvement, leadership style, etc. The study found that the ESDCs in Malaysia and in Bangladesh have similar type of ownership, i.e., the CEOs are the owners, decision maker and technically educated. This technological knowledge and background encouraged them to establish such companies. Both BSDCs and MSDCs started businesses in mid-eighties. But Bangladesh is still in its initiation stage while Malaysian companies reached the growth level. The technical hands are very sensitive in both the countries. Thus an informal and more liberal management style is followed by the company management. Most of the companies are managed by entrepreneur(s). In order to commercialize software, they use both market pull and market push approaches. The corporate culture gets importance by the companies of both the countries. Specific comparisons in strategic areas follow.

Business Strategies

Many researches (Thompson, 1992; Porter 1985; Fitzsimmons, 1994; Hill and Jones, 1995) have identified successful business strategies. These are: (a) Differentiation (This strategy emphasizes presentation of product or service in the market with unique characteristics in design, technology, feature, customer service, dealer network, brand image of the product or services, and cost. However, the primary objective of the strategy is to create customer loyalty), (b) Focus (Also known as niche strategy as it concentrates on a particular buyer group, segments of the product/service line, or geographical market by applying cost leadership and differentiation strategy), (c) Cost leadership (This strategy is to obtain sustainable cost advantage over competitors using low cost as a basis requiring efficient scale facilities, tight cost and overhead control, avoidance of marginal customer account and cost minimization in areas of service, sales force and advertising, and often

innovative technology), and (d) Speed (This strategy is concerned with timely and quickly providing or introducing product or service to the customers).

Table 1: Business Strategies of MSDCS and BSDCS

Strategies	Companies following the strategies (%)	
	MSDCs	BSDCs
Differentiation	78	57
Focus	44	57
Cost leadership	33	43
Speed	00	71

To compare the business strategies between BSDCs and MSDCs, the respondents were asked to identify their business strategies in terms of differentiation, focus, cost leadership and speed. The response shows that (Table 1) MSDCs mainly focus differentiation (mainly in terms of software quality) as a business strategy (78%), while BSDCs mainly emphasize on speed (71%). It is further observed that a significant number of BSDCs are also emphasizing on differentiation (57%) and focus (57%). The least used strategy for BSDCs is cost leadership (43%). For MSDCs speed is non-existent as a separate strategy. At the same time, in many cases focus (44%) and cost leadership is preferred (33%). As noted, in Malaysia the software market is quite large and in a growing phase, and the competition is severe. Sometimes foreign designed software are also marketed. Thus, MSDCs have to compete with quality, efficiency and innovation. While Bangladesh software market is emerging. Competition is not so severe compared to Malaysia. Most of the users have (early '90s) established recently the computerized system or in the process of establishing. As such, BSDCs are competing with efficiency and customer responsiveness with new software. Therefore, presently speed is important for BSDCs. Furthermore, for Bangladesh, if any company has early entry into market, it can easily occupy early mover position. Assuming BSDCs market potential, they should gradually emphasize more on differentiation (in terms of quality and market segments) and focus in addition to speed.

Technological Resources

The Bangladeshi and Malaysian ESDCs' emphasis on 'technological resources' is compared focusing the need of technology use. Sharif (1994 and 1997) and Ramanathan (1994) identified and explained four types of technological resources use: (a) Technoware or Physical technology (refers to both material processing subsystem, and information processing subsystem that may be built into the technoware), (b) Humanware or Know-how technology (consists of the skills needed to realize the potential of technoware; 'contact humanware', e.g., operators of technoware, and 'support humanware', e.g., software specialists or software engineers, etc.), (c) Orgaware or Procedural technology (refers to the support net of

principles, practices and arrangements that govern the effective use of technoware by the humanware - which may be viewed in terms of work convention, work organization, work facilitation, work evaluation and work modification), and (d) Inforware or Know-why technology (represents the accumulated knowledge needed to realize the full potential of the technoware, humanware and orgaware. It can be considered in terms of three categories such as technoware-specific inforware, e.g., inforware needed to operate, maintain, and improve the technoware; humanware-specific inforware- e.g., inforware needed to obtain a good understanding and appreciation of the designing process and the technoware being used; and orgaware-specific inforware, e.g., inforware needed to ensure effective usage of and timely interactions between the available technoware and humanware).

Table 2: Technological Resources of MSDCS and BSDCS

Technology used	Companies emphasizing technological resources (%)	
	MSDCs	BSDCs
Know-how technology (humanware)	89	86
Know-why technology (infroware)	33	14
Physical technology (technoware)	33	00
Procedural technology (orgaware)	00	14

The majority of companies of both the countries (89% and 86% of MSDCs and BSDCs respectively) are found to emphasis mainly on know-how technology (Table 2). Though a significant number of MSDCs use know-why (33%) and physical technology (33%), but for BSDCs these resources are used in very few cases (14% & 0% respectively). BSDCs put some importance on procedural technology (14%) which is not emphasized at all by MSDCs. This is because BSDCs are not established well and also they are weak in internal management. MSDCs put importance on physical technology (technoware) because most of the companies have hardware and distribution business simultaneously. Considering Bangladesh scenario, the BSDCs should gradually emphasize more on inforware and orgaware, thus strengthening their organizational and data base.

Core Competency

Core competency is in other words uniqueness of capability. This integrates a variety of individual skills that will compromise both tacit and explicit knowledge (Hamel, 1994). Four different levels of core competencies are evident in the study by Sharif (1997). These are: (i) Uniqueness in process generating, i.e., innovating and commercializing capabilities (Technology leader), (ii) uniqueness in designing, i.e., conceiving and devising capabilities (Technology follower), (iii) uniqueness in process modifying, i.e., commissioning and improving capabilities (Technology

exploiter) and (iv) uniqueness in vending i.e., marketing and servicing capabilities (Technology extender). In this light, the respondent companies were asked to pinpoint their competency level. The responses show (Table 3) that core competency of MSDCs is mostly in modifying (61%) and in designing (56%), while BSDCs is mainly in vending (71%) This results reflect the needs and demands of the respective customers in each countries. Malaysian customers need modified software (also termed as customized software) while Bangladeshi customers need to start with the new software. Therefore, MSDCs need modifying capability more while BSDCs need vending capability more. Interestingly, generating is least emphasized by both the groups of ESDCs. It is also observed that the BSDCs are to some extent emphasizing modifying (29%) and designing (28%) competencies those they should focus more. This is because, in near future, the present users will be asking for more customized software as per need of the respective organizations.

Table 3: Core Competency of MSDCS and BSDCS

Core competency	Companies having core competency (%)	
	MSDCs	BSDCs
Uniqueness in generating	00	14
Uniqueness in designing	56	28
Uniqueness in modifying	67	29
Uniqueness in vending	11	71

Table 4: Competitive Advantages of MSDCS and BSDCS

Competitive advantages	Companies enjoying competitive advantages (%)	
	MSDCs	BSDCs
Quality	71	56
Efficiency	44	43
Innovation	33	14
Customer responsiveness	33	43

Table 5: Sources of Technology of MSDCS and BSDCS

Sources of Technology	Weighted average*	
	MSDCs	BSDCs
Foreign companies	2.56	2.29
Foreign universities and research institutes	2.33	2.29
Local companies	1.78	1.14
Local Universities and research institutes	1.78	1.14

* index scale (unimportant=0, hardly important=1, important=2, very important=3)

Competitive Advantages

Competitive advantage stems from a company's ability to attain superior efficiency, quality, innovation, and customer responsiveness (Hill and Jones, 1995; Porter, 1985). This comparative study noted that (Table 4) both MSDCs and BSDCs competitive advantage is in ability to attain superior quality of software; but this is more so far MSDCs (71% in response to 56% for BSDCs). Efficiency and customer responsiveness are also found important competitive advantage for both the countries but to a lesser degree. MSDCs are found progressing much in terms of innovation compared to Bangladesh (33% in comparison to 14% of BSDCs). This explains the fact that BSDCs are still much depended on foreign software.

Sources of Technology and Partnering Strategies

The study tried to find out how much importance the two group of ESDCs give to four different sources of technology (anything which is human made and help-mate): foreign companies, foreign universities and research institutes, local companies, and local universities and research institutes. An index scale (unimportant=0, hardly important =1, important=2, very important=3) is used to measure the company responses. It is found that both MSDCs and BSDCs depend on foreign companies, universities & research institutes than the local ones (Table 5). It came out during the survey that MSDCs get technology from foreign companies due to their business interest with them while BSDCs are at the development stage to make such deal with them. As such, the MSDCs receive technologies as partners, but BSDCs get technology from foreign sources through training, seminar and workshop, and expert services, etc. It is already noted that owner-managers of BSDCs usually have sound technical skills but are less competent in the area of business development. In order to address these weaknesses a close relationship is needed between the foreign companies and the BSDCs.

Slatter (1992) found partnering strategy important for ESDCs growth. The various types of partnership are: joint venture, licensing agreement, joint research venture and other informal arrangements. For software development, MSDCs follow mainly joint venture as a main partnering strategy (89%) while BSDCs follow mainly strategies such as hand shake, collaboration, etc. (43%) followed by joint venture (29%). Joint venture is made to reduce cost and risk of new software project, to control over operations and to enter into new or untapped market. Collaboration deals with technical service agreement that involves exchange of humanware and inforware, etc. Though licensing (33%) and joint research venture (22%) are quite significant for MSDCs, these strategies are used in very few cases by BSDCs. Thus for BSDCs collaboration with foreign companies can be stimulating in terms of knowledge transfer, building capabilities and market penetration.

Table 6: Success Factors for Software Development

Success factors	Weighted average*	
	MSDCs	BSDCs
Orientation to customers needs	3.56	3.71
Access to multiple sources of technology	3.33	2.86
Continuous involvement of entrepreneurs	3.11	3.00
Emphasis on strong know-how	2.78	2.71
Managing sympathetically	1.89	2.57

* index scale (very low=1, low=2, high=3, very high=4)

Table 7: Success Factors for Market Development

Success factors	Weighted average*	
	MSDCs	BSDCs
Building and maintaining credibility	3.56	4.00
Building market differentiation	3.44	3.17
Managing the marketing efforts	3.22	2.57
Developing appropriate distribution channels	2.67	2.57
Linking with large customers	2.67	3.57
Speed to market entry	2.44	3.14

* index scale (very low=1, low=2, high=3, very high=4)

Success Factors for Software Development

Researches show that success of technology-based firms is positively related to skills and expertise of entrepreneurs (Schoonhaven, 1990; Lee and Jo, 1996). Slatter (1992) pointed out success factors for software and market development of ESDCs. These are orientation to customers needs, access to multiple sources of technology, continuous involvement of entrepreneur, emphasis on strong technological know-how, and managing sympathetically. A comparison of success factors pointed out by BSDCs and MSDCs for software development are tabulated in Table 6.

The respondents were given above mentioned options to rank in a 4-point scale (very high 4; high 3; low 2; very low 1). The rank order shows that both MSDCs and BSDCs give maximum weight on 'orientation to customers needs'. The next important factor that the MSDCs place importance is 'access to multiple sources of technology', while BSDCs next focus is on 'continuous involvement of entrepreneurs' which is also significantly emphasized by MDSCs. The least focus area both the groups is management sympathetically. It can be mentioned here that BSDCs need to develop the orgaware, hence sympathetic management demand proper weightage.

Success Factors for Market Development

The success factors for market development as indicated by these two groups of companies are also compared in a 4-point scale. The companies were given six market development strategic factors to rank (very high 4; high 3; low 2; very low 1). The strategic factors are: building and maintaining credibility, building market differentiation, managing the marketing efforts, developing appropriate distribution channels, linking with large customers and speed to market entry. The responses show (Table 7) that 'building and maintaining credibility' is to a large extent used by both the groups for successful marketing. Other highly emphasized strategic success factors for MSDCs are: 'building market differentiation' and 'managing marketing efforts'. While BSDCs put high importance on linkage with large customers, building market differentiation and speed to market entry. As is seen ' linkage with large customers' and 'speed' are though high profile market strategic factors for BSDCs, these on the other hand, are low profile strategic factor for MSDCs. Likewise, 'managing the marketing efforts' is an important strategy for MSDCs, while it gets less weight by the BSDCs. These findings support our previous findings that software market in Bangladesh is emerging and speed and early entry into the market is getting more importance. But as already suggested BSDCs should emphasize management of marketing efforts. In this context it can be said that in order to address these weaknesses, it has been suggested that an important part of support activities for BSDCs should be oriented towards the development of their management and business competencies through strategic alliances by transferring software technology.

Other Factors

The comparative study revealed that in Malaysia ESDCs are fairly established while in Bangladesh it is still at the development stage. MSDCs face competition mainly form domestic companies (local and foreign companies which are doing business in Malaysia) while BSDCs face competition mainly from local companies. Sometimes, BSDCs face domestic and international competition too. It should be mentioned here that neighboring India has already developed software industry and they are occupying a significant portion of market shares in Bangladesh.

A major problem of both BSDCs and MSDCs is inadequate infrastructure facilities. Malaysian government took initiatives to develop this industry. They introduced the concept of "Multimedia super corridor" to develop IT industry especially for software development. Based on this vision, Malaysian government already established 'Technology park' to develop R & D and formulated policy to provide financial supports to ESDCs (Jegathesan et al. 1997). On the other hand, Bangladesh government has not yet formulated such plan.

The study further shows that MSDCs have long term strategy to grow and survive. They scan environment continuously and systematically. Moreover, top

management commitments, innovation accepting entrepreneurship-accommodating culture are present there. On the other hand, BSDCs has no long-term strategy because of the high vulnerability of the market. Very few companies have long-term strategies for their future growth. Sometimes top management commitment is also absent. In fact, no 'professionalism' has yet been developed in Bangladesh in this technology-based industry. It is mainly due to the inadequacy of organizational arrangements and absence of long-term policy and strategy. They are also constrained with high cost of technical people and their management. Thus, know-how (humanware) and procedural technology (orgaware) are very important for BSDCs. Dependency on powerful partners, rapid technological change and development are also problems for BSDCs.

The study noted that majority of the personnel are technically educated (software engineers, vocational and short trained technicians) both in MSDCs and BSDCs (80% and 79% respectively). But, of them, software engineers are more in MSDCs (41%) than in BSDCs (24%). For recruitment of technical staff MSDCs follow formal selection procedures while BSDCs mainly use personal contacts to select technical hands. It is observed that the technical people turnover rate (refers to frequency of leaving organization) is higher in Bangladesh in comparison to Malaysia. Finally, the research indicates that personal investment of founders is the major source of capital investment for both the groups (100% and 75% for BSDCs and MSDCs respectively). The next important sources of fund for MSDCs are venture capital companies (25%) and other private investors (25%). While BSDCs get other funds mainly from bank loans (45%) and venture capital companies (29%).

A STRATEGIC FRAMEWORK FOR SERVICE (SOFTWARE) AND MARKET DEVELOPMENT FOR ESDCS IN BANGLADESH

Strategies for software and market development of ESDCs are crucial. This study looked into various aspects of comparative strategies for survival and growth of the ESDCs in Malaysia and Bangladesh. Based on the findings and related researches, a framework of strategy for service (software) and market development of ESDCs in Bangladesh is developed (Figure 1). The framework is two pronged: strategy formulation stage and strategy implementation stage.

Strategy Formulation Stage

This stage explains various strategic issues and goals related to software and market development. Some issues are imperative for success of software development (e.g., orientation to customers' needs; emphasis on strong technical superiority; continuing involvement of the entrepreneur; access to multiple sources of technology; strategic collaboration with large companies and efficiency in management). BSDCs should place more focus on managing technical people,

access to multiple sources of technology, focus on technical resources (specifically, humanware, orgaware and inforware), and strong technical superiority factors. They also should focus on orientation to customers needs along with other factors. The issues that are important for market development are: building and maintaining credibility; building market differentiation; linking with large customers; developing appropriate distribution and selling; managing the marketing efforts; speed to market entry. Here, BSDCs should focus more on managing marketing efforts, developing appropriate distribution and selling channels and customized software. Based on these two types of strategic factors business and technology strategies are formulated in order to achieve company goals (new and customized software development, building credibility and market differentiation and development of humanware and orgaware). Regarding business strategies BSDCs should mainly focus on differentiation and focus. They should also consider speed as it is used frequently together with differentiation and focus. At present BSDCs need to develop customized software; as such, companies need modifying capabilities (role of a technology exploiter) which demand special emphasis on orgaware followed by humanware and inforware. At the same time they need to generate new software, i.e., designing capability (role of a technology follower).

Strategy implementation stage

Strategy formulation stage is succeeded by strategy implementation stage. It begins with the resource accumulation to implement the formulated strategies. As noted, strategy for BSDCs is to develop customized software that require technical resources like orgaware, humanware and inforware. At this stage some internal and external factors may favor or resist implementation. The favorable conditions of BSDCs are: strength in personal contacts in getting orders of software and selling it to the market, and opportunity in growing market demand and its future potentiality. On the other hand, the resisting factors include: weakness in orgaware and humanware, lack of long-term policy, threats from dominance of foreign companies, inadequate infrastructure and government support. This strategic framework is a cyclic process that will continuously provide feedback to every stage in order to keep pace with rapid changes of the SDI. A careful consideration and follow-up of these factors will lead BSDCs to develop software and its market.

CONCLUSIONS AND RECOMMENDATIONS

The comparative study clearly shows that there are similarities and differences between MSDCs and BSDCs in operating environment. MSDCs operating environment is fairly stable and comparatively large. Most of the companies already developed their technological resources, especially, technoware, orgaware, humanware and to some extent inforware to be competitive. Government's direct support is there to develop this industry. Adequate funds sources are also available. Thus, MSDCs are competitive in terms of quality, management and features of

software. On the other hand, operating environment of ESDCs in Bangladesh is highly vulnerable and changing in nature. Most of the BSDCs are new in this business. Turnover of technical people is high. Technological resources are not yet developed. They face fund crisis to initiate new projects. As such, BSDCs are not competitive at all. It can be mentioned here that Bangladeshi software consumers are not so conscious to use software in their activities. There is always pressure from trade unions and other social organizations to live with labor intensive technology rather than capital intensive technology. The majority of companies of both the countries are found to emphasis mainly on know-how technology or humanware. Though a significant number of MSDCs use know-why or inforware and physical technology or technoware, but for BSDCs these resources are used in very few cases. BSDCs are not so established and weak in internal management compared to MSDCs. Thus, BSDCs compete with efficiency and customer responsiveness. Therefore, BSDCs should focus on internal management, building strong human resources and various developments of market and business related information to develop orgaware, humanware, and inforware.

Core competency of MSDCs is found mostly in modifying capability; while for BSDCs, it is mainly vending. The BSDCs need to gradually emphasize modifying and designing capabilities focusing on mainly on customized software development. Efficiency and customer responsiveness are found important competitive advantage for both the countries. MSDCs are better in innovation which will also be important for BSDCs in coming years. Both MSDCs and BSDCs depend more on foreign companies, universities and research institutes than the local ones. BSDCs should focus on building long term relationship with foreign software developers. For software development, MSDCs follow mainly joint venture to reduce cost and risk of new software project, to control over operations and to enter into new or untapped market as a main partnering strategy. While BSDCs follow mainly strategies such as hand shake, collaboration, etc. As an emerging industry, BSDCs need to reduce cost of new software project and control over its operations. Thus, their focus of software developing strategy is to be changed to joint venture arrangements with foreign companies. They need to arrange multiple sources of technology in this regard.

For market development, MSDCs place importance on 'building market differentiation' and 'managing marketing efforts' while BSDCs emphasize on linkage with large customers, building market differentiation and speed to market entry. They have less importance on 'managing marketing efforts' which is very important in developing software market in Bangladesh. The most important focus of BSDCs should be on procedural, know-how and know-why technologies to develop vending, modifying and designing capabilities. Bangladesh should incorporate long term strategy to grow and survive. They also need to scan environment continuously and systematically. Moreover, top management commitments, innovation accepting entrepreneurship-accommodating culture can

be important key points for sustainability of BSDCs. Above all Bangladesh government should come forward with financial and technical supports like Malaysian government to develop potential software industry in Bangladesh.

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